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Original Communications

THE SURGICAL TREATMENT OF UNILATERAL PULMONARY TUBERCULOSIS.*

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Among the large number of patients who die of pulmonary tuberculosis in this country, five-thousand or more per month, there are many whose disease was at one time limited to one side of the chest.

If the same principles of treatment are employed in these cases that we constantly apply in the treatment of tuberculosis of the spine and tuberculosis of joints, a considerable percentage of these patients can be permanently cured. Of course the same dietetic and hygienic methods must be employed which we make use of in the treatment of tuberculosis in general.

It has long been known that a condition of rest of the region involved in tuberculous infection is of the greatest possible importance in producing a cure of the disease. In tuberculosis of the spine, or of joints, we have long employed fixation, preferably with the use of plaster of paris casts.

In unilateral pulmonary tuberculosis a condition of rest has been established by compressing the diseased lung with nitrogen gas, which is repeated often enough to establish fairly uniform pressure.

In cases in which this can be done, surgical interference is not indicated, because the method of immobilization with nitrogen gas pressure is easily accomplished, is safe and gives excellent results, if employed by an experienced, careful physician. There are, however, cases in which this cannot be accomplished because of the presence of adhesions which make the introduction of a cannula into the pleural cavity impossible.

In these cases Jacobaeus, of Stockholm, has introduced a method of treatment which succeeds in a proportion of these cases in freeing these adhesions. He inserts a trochar between the ribs, and through this a thoracoscope, which really is a modified cystoscope, or endoscope, and with this in position he determines the character and location of the adhesions. He then inserts a second trochar and through this a fine electric cautery, with which he burns off slowly the various adhesions, keeping the wire at a dull red heat. After this has been accomplished the gas can be introduced in the same manner as in cases that have no adhesions.

Whenever the lung can not, however, be immobilized by means of gas compression in suitably selected cases, compression of the lung by surgical operation will be indicated.

The operation we have employed for this purpose was brought to this country first by Professor Friedrich, of Marburg, sixteen years ago, when he came over to read a paper as the guest of the American Surgical Society.

Our results at that time were not very satisfactory, because we had not learned how to select the cases, nor how to operate conservatively. In 1912, I visited the clinic of Professor Sauerbruch in the University of Zurich, Switzerland, where I saw a large number of suitable cases which had been operated by the method I am about to describe. In 1920, I again visited the same clinic, now in charge of Professor Clairmont, and found that many of the patients I had seen eight years before were still well and able to earn their living.

Professor Clairmont performed one of these operations in my presence to demonstrate his method and discussed his enormous experience in detail. Since my return I have followed his method carefully and my results have been exceedingly satisfactory. It is important, however, to bear in mind every detail quite as carefully in the selection of cases and in their preparation as in performing the operation.

Selection of Cases.—It is important that one lung be practically normal at the time of operation. If the better lung is already involved in the tuberculous process to quite a marked extent, then the operation is likely to shorten the patient's life.

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The compression and consequent immobilization due to the operation is no better than that which can be accomplished with gas compression in cases free from pleuritic adhesions. Consequently no cases which can be treated satisfactorily by gas compression should be treated surgically. The condition present should be determined by a careful physical examination and confirmed by clear X-ray plates. The latter are also valuable later on in comparing results.

Having determined that the patient is suitable for treatment, he should be placed in bed and kept at absolute rest for at least a week in a room with windows wide open, or better still, on a sleeping porch, in order to accustom the patient to rest in bed. In the meantime much attention should be given to diet.

The operation should be performed under local anaesthesia combined with block anaesthesia, because the patients of this type do not bear general anaesthesia well.

Anaesthesia.—The patient is given a hypodermic of 1/4 grain of morphia and 1/150 grain of atropin an hour and a quarter before the operation is begun, and 1/6 grain of morphia and 1/200 grain of atropin one-half hour before. The morphia is given to reduce the sensitiveness and the atropin is to prevent the secretion of mucus in the pharynx, which will prevent coughing during the operation.

The intercostal nerves are then blocked with 1/2 per cent novocaine one-half hour after the second hypodermic at points three and six cm. from the spine, being careful to carry the needle up into the groove on the lower surface of the ribs and moving the point of the needle sufficiently to be sure to reach the nerve and to saturate the surrounding connective tissue.

The skin is then cocainized in the posterior axillary line for a distance of 4 cm. above and below the intended incision, extending in a vertical line parallel with the spine. We use up to 120 cc. of 1/2 per cent solution of novocaine, or its equivalent.

The position of the patient may be a horizontal one on the side opposite the diseased lung, or it may be banked up on the table in a semi-sitting position, but in the latter case the patient must be very well supported in order not to become exhausted.

Operation.—The following points must be kept in mind throughout the operation:

1. The anaesthesia must be perfect.
2. Unnecessary traumatism must be avoided.
3. Loss of blood must be limited to a minimum.
4. The time of operation must be limited to a minimum.
5. The operation must be made in several stages.
6. At no single operation should enough ribs be removed to transgress the limit of safety; never more than six at one sitting.
7. In case the patient is anemic, an intravenous transfusion of whole blood should be made by the Percy method preliminary to the operation.

The amount of shock to the patient is greatly reduced if the anaesthesia is complete, and this feature is further enhanced by the use of very sharp scalpels and very gentle handling of the tissues.

Assistants and surgeons should apply hemostatic forceps to every bleeding point the moment the incision is made. Most of these points will not require ligatures, as bleeding will not recur when the forceps are removed before the wound is sutured.

These patients do not bear long continued operations well, and if the operation is carefully planned, it is not necessary to consume much time. The most important point to be remembered is that one must not do too much at one sitting.

The operation may proceed so smoothly that after enough has been done at one sitting the surgeon may be tempted to remove one rib after another until quite unexpectedly the patient will collapse. One should never remove more than six ribs at any one sitting no matter how well a patient may seem to stand up under the operation.

Steps of Operation.—A vertical incision is made in the posterior axillary line from the seventh rib above to a point beyond the twelfth rib below. Then after careful hemostasis, as many ribs are exposed to the full extent of the proposed removal as one has planned to excise at the first sitting.

The muscles must be retracted carefully so that the ribs can be exposed to within 3 cm. from their spinal attachment. If more than 3 cm. of rib is left at the spinal end, the compression of the lung is likely to be unsatisfactory.

The length of rib to be removed depends

upon the amount of compression desired, varying from 5 cm. to 20 cm.

It is best to expose all the ribs one intends to remove at one sitting and to strip them of their periosteum before removing any of them, because they will support the chest and prevent coughing, and then when they have all been carefully exposed one can remove them quickly in succession, preferably with the bone cutting forceps, introduced by Professor Key, of Stockholm, or with any other convenient rib cutter.

When one or more ribs have been removed, the resulting irritation is likely to cause coughing. It is important to keep at hand a large mass of fluffed gauze which one can at once press into the space from which the ribs have been removed to prevent the bursting of the pleura. In case the pleura should be injured it is well to close the pleural wound with a handful of vaseline, which should always be kept in readiness for this emergency. A handful of fluffed gauze should be placed over the vaseline and held in place.

If one requests the patient to cease coughing, every effort he may make will fail, but if one asks him to cough more he will not be able to continue. Consequently the moment the patient begins to cough, he should be asked to repeat this with the result of having him stop almost at once, so that the steps of the operation may proceed. The ends of the ribs are carefully smoothed off and covered with muscle.

Then a split rubber tube is inserted to the upper end of the wound and fastened in place with a fine unchromicized catgut suture and permitted to extend out of the lower end of the wound for a distance of 5 cm. A suture is fastened to the lower end so that it can be withdrawn after two or three days without disturbing the wound. The muscles are then sutured with fine chromic catgut and over this the skin is sutured with fine eight-day unchromicized catgut.

A dressing is applied over the wound and held in place with broad rubber adhesive plaster strips extending entirely around the chest, so that the patient will have to breathe with the diaphragm of the good lung, while the diseased lung will be both compressed and immobilized by the circular adhesive bandage. This dressing can be left in place for two or three weeks. On the third or fourth day the tube is pulled out by means of the attached string without disturbing the dressing.

There is great danger of doing too much at any one sitting. It is much better to do the entire operation in three or four stages than to do too much at any one stage.

Usually the patient's condition progresses better if the head of the bed is elevated from ten to eighteen inches after the operation.

The patient may be given nourishment at regular intervals, almost immediately after conclusion of the operation.

By taking the precautions given above, and especially by being willing not to do too much, these patients bear the operation remarkably well.

To summarize, the following conclusions may be worthy of consideration:

1. This treatment is applicable to patients suffering from unilateral tuberculosis of the lung.
2. In cases in which pleural adhesions make compression of the lung with nitrogen gas impossible, this method is valuable.
3. It should be employed only in carefully selected cases.
4. The patient should be accustomed to confinement in bed before operation is performed.
5. Local anesthesia with 1/2 per cent novocaine, or its equivalent, should be employed.
6. Perfect hemostasis should be secured.
7. The operation should be performed in two or three stages.
8. The wound should be carefully compressed in case of coughing to prevent rupture of pleura.
9. The chest should be carefully strapped at conclusion of the operation, the straps completely encircling the chest.
10. There is great danger of doing too much at one sitting.

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A CLINICAL CONSIDERATION OF THE VARIOUS TYPES OF GOITER.*

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The late William S. Halsted felt that the extirpation of the thyroid gland for goiter typified better than any operation the supreme triumph of the surgeon's art. However this may be, it is certain that no problem in the field of medicine or surgery was propounded

*Read at the fifty-fifth annual meeting of the Medical Society of Virginia, in Staunton, October, 14-17, 1924.

so long ago, has been attacked by so many illustrious men, and has cost so much thought and endeavor and so many lives before its management along rational lines was achieved. During the past few years the incidence of goiter in Virginia has attracted the attention of both the professional and lay observer and it may not be untimely to review in a brief way the various types of the disease and the present-day views held with regard to the therapy of each.

The history of the development of our knowledge of goiter is voluminous and at the same time very tangled. Had we time to tell the story, the names of Parry, Graves, Basedow, Schiff, Murray, Horsley, Coindet, Baumann, Kocher, Halsted, Crile and Mayo would stand out prominently in clinical, biochemical and surgical advances that were made. The isolation of thyroxin by Kendall, in 1914; the introduction of clinical calorimetry by Benedict, Tissot and Du Bois, and its application to thyroid diseases, especially by Boothby and Plummer; the study and classification of thousands of cases by many observers; the work of McCarrison and of Marine and his coworkers in prophylaxis of the endemic types, have all led during the past ten years to a clearer conception of the disease, and old theories and classifications of types have suffered new interpretation in biochemical light.

At the present time, perhaps the most generally accepted classification of diseases of the thyroid gland is that of Plummer. This has gained world-wide recognition, because it best correlates the functional, structural, etiologic and clinical characteristics of the disease.

According to this observer we may group the types of thyroid disease as follows:

1. Diffuse colloid goiter.
2. Adenomatous goiter without hyperthyroidism.
3. Adenomatous goiter with hyperthyroidism.
4. Exophthalmic goiter.
5. Myxedema.
6. Cretinism.
7. Childhood myxedema.
8. Thyroiditis.
9. Malignant disease of the thyroid.

It is with the first four types that I wish especially to deal, not that the others are unimportant, but because the first mentioned types are more commonly met with in everyday practice.

A few words may be said of the physiology of the thyroid gland and its aberrations in form and function in each of these states. The normal thyroid gland weighs 45 gm. It consists of many acini lined with low columnar epithelium, separated by a sparse stroma. In many places, especially at birth, the acini are without a cavity and the lining cells are not completely differentiated. The term fetal acinus is applied to such types. As the acinus becomes developed it is filled with pink staining colloid.

The production of thyroxin is the function of the gland. This appears to act chemically as a catalyst hastening the rate of chemical changes in the body, or, as Plummer has expressed it, "the rate of formation of a quantum of potential energy available for transformation on excitation of the cell." The action of thyroxin is thus closely related to the heat producing forces of the body. Basal metabolism, meaning the mathematical expression in calories per square meter per hour of the basal heat production of an individual under standard conditions, is found to vary within wide limits in the various thyroid dysfunctions, and experimental evidence goes to show that it is the abnormality in quantity and probably in quality of thyroxin secreted that is instrumental in bringing about this variation.

The normal basal metabolism is not fixed, but a variation of from minus 10% to plus 10% may be considered normal, while a variation from plus 10% to plus 120% and from minus 10% to minus 40% is distinctly pathologic, if the reading be found consistent on repetition.

The thyroxin content of the tissues (exclusive of the thyroid gland), averages 14 mg. Between 0.75 mg. and 1 mg. is exhausted daily. A shift of 1 mg. thyroxin in the tissues is accompanied by a rise or fall of 2 to 3% in the basal metabolism. Plummer holds that the drop of thyroxin in the tissues is the stimulus that causes the thyroid gland to secrete thyroxin. The basal metabolism of a thyroidless individual is from 30% to 40% below normal. The edema of myxedema becomes recognizable when the basal metabolism drops from 15% to 17% below the average normal. The rate of exhaustion of thyroxin in the tissues varies with the activity and stress of the patient, or

in other words, with his total metabolism. It is the consensus of opinion that hyperthyroidism, or excessive secretion of the thyroid gland, finds almost a mathematical index in the relative elevation of the basal metabolic rate.

Diffuse Colloid Goiter.

This is a diffuse, symmetrical enlargement of the thyroid gland, pathologically associated with the deposit of an excess of colloid in the acini and clinically unassociated with the symptoms of hyperthyroidism.

Colloid goiter is an endemic disease. In our country it occurs in the northern part of the area extending from the Appalachian range to the Rocky Mountains, reaching its greatest incidence in the Great Lakes basin. From the etiologic standpoint, McCarrison has shown that the disease in the Himalayas is probably related to the water supply. The experiments of Marine and Luckhart in fish hatcheries would indicate a bacterial etiology, and McCarrison supports this view. Bacteria are supposed to interfere with the proper assimilation of iodine, and thus it is held to be a deficiency disease due to lack of available iodine for systemic assimilation.

An abnormal increase in the amount of colloid is constant, this being held to be an inactive waste or by-product of the gland put forth in an effort to maintain the normal amount of thyroxin in the face of an insufficient amount of iodine. The blood supply of the gland is abnormally increased.

Colloid goiter occurs most frequently in young girls near puberty, less frequently between twenty and twenty-five years of age. Enlargement is aggravated by the menses and by pregnancy. Symptomatically there is diffuse enlargement of the thyroid gland; bruit and thrills are frequently found, but none of the general or constitutional symptoms of hyperthyroidism are found. The basal metabolic rate is within normal limits, although occasionally the rate may be as low as minus 15% to minus 17%, with dry skin and other symptoms suggestive of a mildly hypothyroid state. Complaint of slight nervousness, fullness in the neck, and globus sensations are common, but actual pressure symptoms are rare.

In the prophylaxis and treatment of colloid goiter iodine holds first place. Coindet nearly a century ago introduced this form of therapy. Marine and his co-workers showed that iodine, fed in small doses over a period of two weeks until 2 gm. were given, prevented the development of goiter in a group of school girls in Akron, whereas the incidence in a control group was high. The use of iodine internally in treatment, however, is slow, and at times uncertain, in its results. Dried thyroid extract in doses of 1 grain or more daily, depending upon the tolerance of the individual, seems to supply the missing secretion in a better way and will frequently cause recession of the gland when iodine fails. The use of thyroxin by mouth or by intravenous injection will usually cause a rapid decrease in the size of the gland. In using the thyroid preparations, and especially thyroxin, careful check on the patient's symptoms and frequent basal metabolic readings are essential. The pulse should not be elevated over 100 per minute and the basal metabolism should not be raised over 10%. Thus this form of treatment requires careful, almost daily, observation and should be reserved for the specialist in this line of work. The use of table salt containing small amounts of sodium iodide, has recently come into vogue and is of great value in many cases. However, its greatest field of usefulness will probably be found in preventing the incidence of colloid goiter and of adenoma in coming generations.

Adenomatous Goiter Without Hyperthyroidism.

This is an adenomatous enlargement of the thyroid which is causing no toxic symptoms. Nodules from microsopic size to huge spherical tumors present themselves on palpation. The largest goiters are found in the group, and it also includes most of those that grow around the trachea, or substernally.

The incidence of the disease seems to follow closely that of colloid goiter as regards both age, sex, and geography. Prophylaxis is successfully met by the administration of iodine. Pathologically, fetal or adult adenomas may occur. A capsule is usually present, but in a certain small group with many small adenomas we find no capsule, a condition to which Wilson has applied the term "adenomatosis." Areas of hypertrophy resembling that noted in exophthalmic goiter have been described, but the clinical features are entirely dissimilar.

Symptomatically, nodular swellings, unsymmetrical and most frequently multiple, are determinable. As in colloid goiter, pregnancy

and gravidity may accentuate growth. Vascularity to the point of thrills and bruit is not the rule. Pressure on the trachea, or the recurrent laryngeal nerves, is frequent. There may be interference with the vocal cords, at times with no alteration of the voice. Hence the value of routine laryngoscopy. Constitutionally a tendency to hypertension has been noted in individuals of the group. The heart is not affected except from respiratory obstruction. The basal metabolic rate is normal, or slightly decreased, as in colloid goiter.

Colloid goiter may occur with adenomas, sometimes concealing the latter, which appear only as the colloid is absorbed under medical treatment.

The prophylactic administration of iodine will probably prevent the development of adenomatous goiter, but its use in therapy was shown by Kocher to be contraindicated, as iodine given to patients with non-toxic adenomas not infrequently leads to hyperthyroidism of the toxic adenomatous type, Kocher called the hyperthyroidism induced by such treatment "Jod-Basedow." Thyroid extract or thyroxin are held by most observers not to possess this danger and they will cause regression of the size of the gland in a certain number of cases. The most rapid effect is obtained by administering thyroid extract or thyroxin, repeatedly checking the basal metabolic rate so that this is maintained for a time about ten per cent above normal. This will soften up the adenomas but seldom brings about complete disappearance, especially after twenty-five or thirty years of age.

Surgical extirpation is indicated when the goiter becomes unsightly or causes local symptoms of pressure. The tendency of this type of goiter to become toxic in perhaps 25 to 30% of the cases as age advances makes surgery more advisable the older the patient. Any patient with adenoma, over 30 years of age, should be cautioned as to the gravity of the situation and its possibilities, and should have careful examination several times a year as to the question of beginning toxicity.

Adenomatous Goiter with Hyperthyroidism.

This is a constitutional disease in which adenomatous tissue, by secreting and maintaining an abnormally high and unregulated amount of thyroxin in the body, causes an increased basal metabolic rate with resulting secondary manifestations. The terms toxic adenoma and hyperfunctioning adenoma are synonymous, while the less accurate terms, exophthalmic goiter without exophthalmos, Basedowized goiter, incomplete exophthalmic goiter, formes frustes, etc., were loosely used to describe the condition before Plummer recognized it as an entity. The term goiter heart, or Kropfherz, also was used in describing the cardiac weakness and tachycardia seen in the disease. This cardiac effect was attributed to pressure on the vagi and sympathetics, an impression we know to be erroneous.

About one-fourth of all adenomas operated on show hyperthyroidism, and the incidence of toxic adenoma is high where adenomas are frequent. This is not uniform, however. For instance, McCarrison says that toxicity in adenomas in the goitrous districts of India is rare. Functionally, all the evidence at hand shows that the toxic adenomatous goiter secretes an excess of thyroxin; this elevates the metabolic rate, affects the heart and other organs and produces the symptom complex.

Pathologically, MacCarty has shown that areas of hypertrophy are more frequent than in non-toxic adenomas. Wilson holds that the colloid of toxic adenoma stains less densely than the colloid of the vesicle in the non-toxic type. Hyperplasia of the thymus occurs in less than one-half of the toxic adenomas coming to autopsy.

Toxic adenoma is rare under 30 years of age; 78% are over 40 years of age and one-half over 50 years, while the average age of the patient coming under observation is 48 years.

Symptomatically the patient has noted goiter at the age of 15 to 20 years, this usually of the non-toxic type. About 16 years later, on an average, the patient begins to complain of increase in nervousness, coming on insidiously, over a period of two or three years. Fatigue, loss of weight, increase in appetite, perspiration, a pounding tachycardia and palpitation, with mental instability, are accompanying features which gradually and unceasingly increase in severity. Often there is an exacerbation associated with an increase in the size of the gland. There are no remissions; exophthalmos is absent, as also are gastrointestinal crises, and jaundice, which are met with in the exophthalmic type.

An unsymmetrical nodular thyroid enlarge-

ment, with bruits and thrills in less than 4% of the cases, is found. Small adenomas are prone to develop the disease, and the condition of adenomatosis may give rise to toxic symptoms of the type, with the gland apparently symmetrical on palpation. The basal metabolic rate is gradually elevated, running from 15% to 20% in the early stages and becoming much higher in protracted cases. The blood pressure is elevated in both limbs and the pulse pressure is increased. If the diastolic pressure is not elevated, it will be found that the systolic and pulse pressures mount with the metabolic rate. The volume output of the heart is increased; tachycardia, with an ever-increasing pounding beat, and gradual cardiac dilatation are noted. After a time premature contractions, later followed by auricular fibrillation with pulse deficit, come to attention. Palpitation, dyspnoea, and finally myocardial decompensation, add themselves to the distressing picture.

The clinical management of the condition will be considered after a discussion of exophthalmic goiter as the two types are both surgical, yet require careful distinction in management.

Exophthalmic Goiter.

This is a constitutional disease, apparently due to excessive secretion of an abnormal hormone by an enlarged thyroid, showing pathologically a diffuse, parenchymatous hypertrophy and hyperplasia.

No exact figures as to distribution are available. It does not parallel the regional distribution of colloid or adenomatous goiter, occurs in mountain or sea districts, and seems unrelated to the iodine content of soil, water, or food.

Etiologically, the work of Cannon, Wilson, and of Eppinger and Hess would suggest that the disease is due to repeated stimulation of the sympathetic nervous system, possibly of the superior cervical ganglia. Functionally, there seems to be an excessive secretion of a catalytic agent which differs in some way from the normal thyroxin. The hyperthyroidism produced by repeated intravenous injections of thyroxin simulates that of toxic adenoma, but in no way approaches the condition found in exophthalmic goiter. Kendall suggests that the thyroxin molecule in exophthalmic goiter may be so altered that an abnormal but related compound may be formed and excreted with the exophthalmic goiter syndrome as a consequence.

Pathologically there is a symmetrically enlarged gland varying from a scarcely noticeable, or unnoticeable, enlargement, to one 3 in. by 4 in. in size. Diffuse parenchymatous hypertrophy and hyperplasia are noted in 99% of the cases. Imbedded adenomas are found in about one-third of the cases. Two-thirds of the patients coming to autopsy have enlarged thymus, with lymphoid hyperplasia. Changes in the sympathetic ganglia have been noted by Greenfield and Wilson. Concurrent adenomas of larger size may give the gland an unsymmetrical appearance. The vascularity of the gland is markedly increased.

The age incidence of exophthalmic goiter is highest between 20 and 40 years, the average age being about 37 years, when coming to operation. Females are affected nearly five times as frequently as males.

Symptomatically, the disease has a rather sudden onset. We recognize remittent types with a more gradual onset of nervousness and tachycardia, scarcely recognizable to the patient. Some psychic shock abruptly brings on a crisis, with extreme intensification of all symptoms. Loss of weight and strength, palpitation, gastrointestinal crises with nausea, vomiting, and diarrhea, with jaundice at times as an ominous sign of hepatic degeneration, from which there is little hope of recovery, all with extreme nervousness of a peculiar type, are characteristic symptoms which become prominent during the crisis. The patients are confident of their ability to withstand stress and go to the point of exhaustion, a great point in differentiation from neurasthenia. Continuously on the move, making semi-purposeful actions, irritated on resistance, bursting into tears, with quick restitution of composure, we have a rather unusual psychic picture, but one altogether rather optimistic. A stage of depression is a rather bad omen. If the patient survives this crisis he will have a period of partial or complete remission for several months, to be followed again and again by hyperthyroid waves or crises of varying intensity. Waves of hyperthyroidism usually take place over intervals of about three months.

We may recognize also a chronic form of the disease which has an even and milder course, uninterrupted by waves of exacerbation. The

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disease may begin as the remittent form, to continue as the chronic.

The clinical findings show that the sympathetic nervous system suffers the brunt of the attack in contradistinction to toxic adenoma where the cardiovascular system is chiefly affected. The basal metabolic rate is increased, running from plus 10% to plus 100% above normal. The basal metabolic rate tends to parallel the clinical features of the disease, falling in remissions to a variable degree. However, the basal metabolism only expresses the rate of body catabolism and does not take into account the factors of anabolism. If the increased heat output is maintained largely from the exogenous source of food intake, a high metabolic rate will not be of as serious import as a lower rate, which is being maintained from endogenous sources, such as the destruction of body cells.

Exophthalmos is present to a greater or less degree in most of the cases, but is absent often enough to say that it is not a *sine qua non* for diagnosis. The eye signs of Graefe, Moebius, Stelwag and Rosenbach are well known and frequently occur, but are of little real diagnostic import.

Increased vascularity of the enlarged gland is common and about 70% of the cases present thrills and bruits, especially over the enlarged and tortuous superior thyroid vessels. The heart is enlarged, imparting a heavy impact on palpation, and tachycardia follows closely the basal metabolic rate elevation. Murmurs are frequent, and especially a systolic murmur over the pulmonary area, a condition which is also noted with toxic adenoma. Decompensation, edema and ascites are not uncommon. Auricular fibrillation is a later finding, occuring in about one-fifth of the cases. It usually occurs intermittently, but when chronic, it decreases life expectancy. Flutter is rare, but an ominous sign, and digitalis should be pushed to the point of vomiting or even heart block before operating under such circumstances. In this way either fibrillation or normal sinus rhythm may be obtained.

The blood pressure shows a decreased or normal diastolic pressure, with a normal or slightly increased systolic pressure. If the diastolic limb is elevated the systolic will be increased also. Hypertension is rare in contradistinction to toxic adenoma, where it is a frequent finding.

The nervous system shows a fine rapid tremor of the tongue and extremities, weakness of the quadriceps, profuse perspiration and moist hot skin. The quadriceps weakness is of real diagnostic import.

Erythema of the elbows and arms frequently precedes a gastrointestinal crisis. Urticaria and distinct pigmentation of the skin also occur.

Fever is uncommon except as a part of the terminal picture, or due to intercurrent infection.

The body weight is rapidly lost and may be taken as a rough index of the severity of the disease.

The blood picture shows a relative and absolute mononucleosis, leucopenia taking place at the expense of the neutrophiles. The blood chemistry and nitrogen partition reveals little diagnostic import. Nephritis and diabetes are occasional complications, but a transient glycosuria may be present in about 2% of the cases.

Toxic adenoma and exophthalmic goiter may superimpose their symptoms to a variable degree in the same patient and lead to a great variety of clinical pictures, which are often difficult of differentiation.

The Treatment of Toxic Goiter.

This is a phase of medical and surgical specialization and can only be touched upon. Surgical extirpation of a large part of the gland is the most common measure and gives great success in the majority of cases. The mortality of operation has been reduced by Crile and the Mayo Clinic surgeons until it is now around 1%. X-ray therapy and radium find advocates in the treatment of exophthalmic goiter, both pre-operatively and as the sole therapeutic agent. The reports of Means and Holmes and their co-workers at the Massachusetts General Hospital are full of interest and offer much hope for the future. Prolonged rest has been shown to be efficacious and has been championed by Kessel, Lieb, and Hyman, of the Mt. Sinai Hospital. On the whole, surgery still finds favor. It is the opinion of most radiologists that toxic adenomas are little benefited by radium or X-ray.

Rest, quiet, forcing of fluids, high carbohydrate intake, with low protein diet, local anesthesia, digitalis, ice packs, and other hygienic measures are involved in pre-operative and

post-operative management of both forms of toxic goiter. Preliminary ligation of one or both superior thyroid vessels in severe cases of the exophthalmic type has long been practiced with benefit. It is of no value in the toxic adenomatous types.

During the past year and a half the introduction of the administration of Lugol's solution in doses of five to ten drops from one to three times daily, has been shown to be of tremendous benefit by Plummer and his co-workers in reducing temporarily, at least, the toxic symptoms of exophthalmic goiter. After a few days the symptoms of nausea, vomiting, diarrhea, cardiac decompensation, with the basal metabolic rate, all subside in the majority of cases. The indications for ligation are less frequent, and the immediate mortality from hyperthyroidism is brought near zero.

Iodine is not used in the toxic adenomatous cases, but may be tried when, in addition, the symptoms of exophthalmic goiter are superimposed. The use of iodine in exophthalmic goiter has not gone unchallenged, but in the light of reports from the Mayo Clinic it would seem that this form of treatment is a real advance and that its application will soon become general.

The last word in our conception and management of goiter has yet to be spoken, as is evidenced by the numerous articles appearing each month with conflicting statements. I trust that this resume of the features of colloid goiter, adenomatous goiter without hyperthyroidism, adenomatous goiter with hyperthyroidism, and of exophthalmic goiter, which has been presented chiefly from the point of view of the practitioner, may be considered as not without some small value at at time when our interest in the study and control of the disease in our own state is being aroused.

BIBLIOGRAPHY.

1. Boothby, W. M., Plummer, H. S., and Wilson, Louis B.: Diseases of the Parathyroid and Thyroid Glands. Oxford Med., Vol. III, Chap. XV, pp. 831-963.
2. Boothby, W. M. and Sandiford, I.: Laboratory Manual of the Technic of Basal Metabolic Rate Determinations. Phila. Saunders, 1920, 117 pp.
3. Crotti, A.: Thyroid and Thymus. Phila. Lea and Febiger, 1918.
4. Crile, G. W., and Associates: The Thyroid Gland, 1922.
5. Halsted, W. S.: The Operative Story of Goiter. Johns Hopkins Press. Balto. (Privately printed).
6. Kendall, E. C., and Associates: Series of Papers on Isolation and Identification of Thyroxin. Collected Papers of the Mayo Clinic. 1915-1923. Saunders, Phila.
7. Means, J. H., and Holmes, G. W.: Archives of Int. Med. March, 1923.
8. New, G. B.: The Larynx in Diseases of the Thyroid. Annals of Clin. Med. Vol. I, No. IV, Jan., 1923.
9. Plummer, H. S.: Interrelationship of Function of the Thyroid Gland and of Its Active Agent Thyroxin in the Tissues of the Body. Jour. A. M. A., Vol. 77, pp. 243-247, July 23, 1921.
10. Plummer, H. S.: Jour. A. M. A., June 30, 1923.
11. Plummer, H. S., and Boothby, W. M.: The Value of Iodine Administration in Exophthalmic Goiter. Jour. Iowa State Medical Society, 1924, Vol. XIV, pp. 66-73.
12. Sistrunk, W. E.: Indications for the Surgical Treatment of the Different Types of Goiter. Surgery, Gynecology and Obstetrics, Oct., 1921, pp. 348-352.

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THE SIGNIFICANCE OF THE SPLEEN, IN THE LIGHT OF EMBRYOLOGICAL, EVOLUTIONARY, AND EXPERIMENTAL DATA.*

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A recent volume on the "Surgery of the Spleen," by Pool and Stillman begins with the following sentence: "Of all the structures in the body, the spleen pre-eminently deserves the name of organ of mystery." In the second paragraph of the Introduction appears the statement: "The spleen alone is a dispensable organ." Subsequently in the text appear these words: "The pathology of the spleen is obscure in many respects"; "the surgery of the spleen is still largely empirical, based chiefly upon hypothesis and the observations of patients after operation"; "the microscopic anatomy of the spleen, while apparently relatively simple, is not fully understood"; "in spite of extensive investigations, little is actually known about the function of the spleen"; "the results of experiments are meagre."

The foregoing statements are abundantly supported through 327 pages. They are, moreover, typical of the general statements regarding the spleen in similar works. The fact remains that the spleen continues to be very much of an enigma. We would seem to have progressed in specific knowledge of the spleen not very far beyond the point where Galen left the matter almost two thousand years ago with the statement that "the spleen is an organ of great mystery." This is not meant to minimize or disparage either the quality or the

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value of the great volume of investigations on the spleen. It emphasizes rather the unusual difficulty of the subject.

The fact of this paucity of definite knowledge regarding the function of the spleen has moved me to attempt to effect an advance, however slight, by approaching the question of the significance of the spleen coincidently from three different directions, namely, from the direction of its embryology, its racial history, and the effect of its extirpation in lower forms like the frog. These three combined modes of attack have led to a consistent interpretation which serves at least as a sound basis for further more detailed investigation, more especially as regards spleen pathology.

We may most profitably examine first the embryological evidence. What can we learn regarding the probable function of the spleen from an examination of its development in the mammalian embryo? In a pig embryo of about 10 mm. length, corresponding roughly to a human embryo of about 40 days, the primordium of the spleen becomes discernible as a slight swelling on the left border of the dorsal mesogastrium. This swelling results from a proliferation of certain mesenchymal cells which round up and assume the appearance of large lymphocytes. As the differentiation and proliferation of these primitive lymphocytes continue, the swelling gradually enlarges, and the definitive spleen begins to project into the celom, maintaining connection with the mesogastrium through the gastro-splenic ligament. Increase in size results secondarily also in part from the migration of lymphocytes from out of the mesentery into the spleen primordium. Meanwhile the spleen primordium has become extensively vascularized by the penetration of branches from the mesenteric artery which, breaking up into an extensive capillary net, communicate with the branches of the splenic vein. According to Thiel and Downey ('21) already in pig embryos of 6 to 7 cm. (corresponding to a human embryo of about 90 days) there occurs communication between the vascular capillary network and the primitive splenic sinuses, and the open sinusoidal circulation characteristic of the adult spleen is established.

Beginning with a stage of about 30 mm. in the pig, the blood-forming activity of the spleen becomes discernible. The process is initiated by the separation from the mesenchyme of large round cells with basophilic cytoplasm, resembling large lymphocytes. By the 40 to 60 mm. stage of development these primitive blood cells, or hemoblasts, become distinguishable as erythroblasts by their content of hemoglobin. These hemoblasts occur generally as small groups of cells, for the most part located extravascularly, that is, outside of the fenestrated sinuses, though frequently on their margins. Only subsequently do the granulocytes appear. After the earlier stages the predominating type of lymphocyte is of the small variety. These may enlarge to become lymphocytes of the large variety.

The embryology of the spleen reveals, then, that its essential function is originally erythrocytopoietic; that the red cells develop from lymphocyte-like cells derived from the mesenchyme, and that red cell formation is associated with an open system of sinusoidal blood-vessels. The blood-forming function of the spleen, however, is transient. Prior to the 5 mm. stage (about 30 days), blood is formed in similar manner from the mesenchyme of the yolk sac, body wall, liver and kidney, and possibly in small part also from the endothelium of the liver capillaries. Subsequently to the fifth month of human development, the spleen gradually loses its blood-forming function, the process being surrendered to the red bone marrow, until at birth the spleen is practically a mass of lymphoid tissue in which lymphocytopoiesis and the later stages in the process of the elimination of senile red cells predominate. In short, the post-natal spleen is essentially an embryonic remnant, notwithstanding its relatively large size. Moreover, since red bone-marrow occurs already toward the end of the second month, splenic hemopoiesis is apparently never functionally important in mammals. This fact suggests that the spleen is interpretable fundamentally rather as an evolutionary than an embryonic remnant.

The racial history of the spleen tells the same story. And it is interesting to note in the case of this organ the beautiful demonstration of the so-called law of recapitulation, namely, the statement that the embryo or any of its organs recapitulates in development the stages through which the race progressed during its evolution.

Beginning with the lowest vertebrate, the lancelet (amphioxus), we note that a spleen is not yet present. Moreover, this form contains

no red blood cells. Its colorless blood cells are derived from hemoblasts differentiated from body mesenchyme. Passing to the round-mouthed fishes, e. g., the lamprey, what may be called a diffuse spleen appears throughout the wall of the entire mid gut. This form has both red and white blood cells. Beginning with the true fishes, a sharply marked spleen occurs attached to the mesentery, consisting of an extensively vascularized mass of segregated lymphocytes, very active in red cell formation. In the lung fishes, however, the spleen is still in the stomach wall (Wiedersheim). Lung fishes represent the transition stage between a diffuse spleen and a sharply segregated spleen, and resemble the ontogenetic stage where the spleen primarily appears in the dorsal mesogastrium.

When we come next to the amphibia, e. g. frog, a new stage appears. Here the spleen is practically the sole organ of blood formation for the greater part of the year. However, for a very brief period immediately after hibernation, red marrow appears in the long bones, very active in red cell formation, the spleen at this time being little more than a mass of reticular tissue almost free of lymphocytes. Amphibians, moreover, lack lymph nodes and nodules, except for very small and variable diffuse masses of lymphocytes in the pharynx, axillae and groins. These foreshadow the lymph nodes of higher forms.

Beginning with certain reptiles, more definitely indicated in birds and mammals, the spleen has practically lost its capacity for red cell formation, and the marrow now becomes essentially the sole organ of hemopoiesis. Beginning with reptiles also, characteristic lymph nodes occur.

The racial history of the spleen thus reveals the following facts: That the spleen represents a segregation of intestinal and mesenteric lymphocytes in the region of the stomach; that these lymphocytes function as hemoblasts in the differentiation of red blood cells; that up to and including amphibia, the spleen represents a combination of both lymphoid and myeloid tissues, with a corresponding dual function; that beginning with reptiles this dual structure and function is surrendered to, and divided between, lymph nodes and red marrow; and finally, that the spleen itself persists in mammals as a phylogenetic remnant without essential function. Evolutionary data confirm the embryological evidence as indicating a primarily erythrocytopoietic function for the spleen.

A few exceptions and variations must be noted, and certain details added. In fishes generally, the kidney (mesonephros) which is here characterized by an extensive sinusoidal circulation connected with a renal portal system, assists greatly in the function of blood formation. Indeed it would seem that the primitive kidney of many of these forms is the chief seat of blood formation. This is true also of the fish-like larval form of amphibia, e. g., the tadpole stage of the frog. The hemopoietic capacity of the mesonephros is gradually surrendered both in ontogeny and phylogeny to the spleen. Another striking variation in hemopoiesis relates to certain elasmobranchii (e. g., sharks and skates), and to salamanders. In the case of the skate the granulocytes are formed almost exclusively in the capsule and connective tissue septa of the testes and ovaries, red cells only in the spleen; in the case of the salamander, the granular leucocytes are formed chiefly on the border of the liver; the red cells only in the spleen.

The close relationship between red cell formation and abundant sinusoidal blood supply must be emphasized. The essential fact in this condition inheres most probably in laggard movement of the blood and the relatively high content of CO_2. This is illustrated in yolk-sac wall, liver, primitive kidney (mesonephros) spleen and bone marrow. Granular leucocyte formation seems related rather to conditions of meagre vascularity as in the periphery of the liver of the salamander, and the capsule of the testes and ovaries of shark and skate.

We may pass next to the experimental data. Malpighi (1686) was the first to claim an internal secretion for the spleen. A large body of experiments deals with efforts to demonstrate a splenic hormone. Downs and Eddy ('20) administered protein-free extracts of the spleen to various laboratory animals. They observed a transient decrease of red cells (lasting two to three hours), in the peripheral blood followed by a definite and more persistent increase, not only in the whole number of red cells, but also in the proportion of reticulated (young) erythrocytes. The feeding of the spleen substance or splenic extracts, when attempted as a therapeutic measure, has yielded no uniform or striking effect. Pool and Stillman state that the results claimed by Har-

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rower ('16) and Carpenter ('00), for such procedure, need confirmation before they may be accepted.

More recently Leake and Evans ('23) also claim a hormone function for the spleen, stimulating hemopoietic activity in erythrocytogenic centers. The following quotation gives the method and results:

"Intravenous injections into rabbits on three consecutive days of 1 c.c. per kilogram of a 5 per cent filtered solution of fresh spleen in saline caused a fall in the number of circulating erythrocytes within twenty-four hours after the first injection of about 8 per cent below normal. The day following the third injection, however, the red blood cell count was 7 per cent above normal, on the average, from which it fell gradually to normal within five days after the administrations were stopped. The hemoglobin percentage showed little constant change.

"Similar injections of fresh red bone marrow caused a gradual increase in the erythrocytes to 15 per cent above normal on the average, twenty-four hours after the third injection. From this figure, return to normal was noted within two days after administration was discontinued. The hemoglobin did not increase in proportion to the rise in the red cells.

"Similar injections of combined extracts of fresh red bone marrow and spleen resulted in an increase of 19.5 per cent on the average, in the number of circulating red blood cells on the day after the third injection, with a return to normal five days after injections ceased. The hemoglobin did not rise in proportion to the increase in the erythrocytes. There was no significant change in the urine output in any of these animals during the period of experimentation."

In all of these cases, however, it is to be noted that there is first a decrease in the number of reds, and that only subsequently to the decrease does an increase follow. Moreover, the narrow extract is more effective than splenic extract. It may be suggested that the erythrocytopoietic stimulus is here of the same nature as that present in the case of red cell destruction or elimination by other agents and not a specific splenic hormone at all. Even experimental hemorrhage gives somewhat comparable results (Hough and Waddell, '16). Brills' ('24) suggestion that the spleen perhaps elaborates a hormone which may control the normal tonicity of the capillaries—the absence of which hormone, in addition to the thrombocytopenia, and altered quality of the platelets under splenic influence, he believes to be an important etiologic factor in essential hemorrhagic purpura—remains an interesting speculation. The evidence for a specific splenic hormone is practically nil. This is only what was to be expected in view of the embryological and comparative anatomical data.

We are interested chiefly here, however, in extirpation experiments. Partial or total extirpation of the spleen in man, following disease or injury, has been often resorted to, apparently without serious consequence. Probably no less than 1,000 splenectomies are now on record, including partial and total splenectomies, done for various causes, including generally injury and disease. In 1908, G. B. Johnston collected from the literature 708 cases of human splenectomy, including 514 recoveries and 194 deaths, a mortality of 27.4 per cent.

"Eccles and Freer ('21) report a remarkable instance in which an abdominal operation, performed eight years after a splenectomy for rupture in malaria, revealed the presence of a spleen which was normal in size and appearance. Faltin, six years after, and Kullner, five years after splenectomy, found numerous small nodules of splenic tissue in the abdomens of their patients."* Faltin interprets his case as the result of a supplementary growth of latent hemolymph nodes.†

Splenectomies of laboratory mammals, particularly the dog, have been frequently performed since the beginning of the eighteenth century. Krumbhaar and Musser ('14), and Pearce and Pepper ('14) agree in attributing to splenectomy in the dog the effect of stimulating the hemopoietic activity of the marrow. The former noted an increased production of red cell in the marrow; the latter a conversion of yellow into red marrow. Meyer ('14) reports that splenectomy in the dog is not followed by an increase in the number or size of the hemolymph nodes, as claimed by Warthin ('03), nor by a production of accessory spleens. Austin and Pearce ('14) conclude, on the basis of their results with splenectomies on the dog, that the spleen, contrary to the claim of Pearce and Pepper, does not exert a constant and important function on iron metabolism. Hirschfeld and Sumi ('24) report the significant observation that in splenectomized rats, mice and guinea pigs, monocytes phagocytose red blood corpuscles in the circulating blood.

Similar experiments on lower vertebrates

*Quoted from Pool and Stillman.

†J. R. Lee (The Lancet, Vol. I, pg. 1321, June 30, 1923) reports a case in which splenectomy had been performed at the age of 14, for traumatic rupture. Fifteen years later he reopened the abdomen for intestinal obstruction and, in the course of the operation, found the entire small intestine studded with small tumors, two of which were removed and diagnosed as splenic tissue by microscopic examination. These splenic tumors, about three hundred in number, totalled approximately the volume of the normal spleen.

have been recorded only thrice previously as far as I am aware. Drzewina ('05) reported splenectomies on anguilla (eel), with the result of a hyperplasia of lymphoid tissue of the kidney. Daiber ('07) removed the spleen primordium in the larval salamander (Siredon pisciformis). This resulted in the development of several accessory spleens, and the transformation into spleen-like tissue of a portion of the gut wall. Schonbauer and Sternberg ('24) extirpated the spleen in salamander and other animals, and report that the organ did not regenerate.

During the past three years Dr. Speidel and I, working in my laboratory, have performed no less than eighty splenectomies in frogs of various sizes and ages, and both sexes, at all seasons of the year. Approximately fifty per cent survived the first three week period after the operation. Of those that survived this period, a certain number died about the sixtieth day, with all the clinical and microscopic signs of anemia. These showed neither spleen, red marrow, nor hemopoietic activity anywhere. The remainder could be kept almost indefinitely. We have kept some alive as long as nine months without apparent sign of ill health or functional incapacity. Of these, five, including two partial and three total splenectomies, regenerated a new spleen, apparently normal and hemoptically very active. The remainder developed no spleen of characteristic gross appearance or normal site (near rectum). Among them, however, several showed a conversion of their fat bodies into a hemopoietic tissue resembling the spleen or marrow, a few developed active red marrow in the long bones, and the greater number showed a reversion to the condition of larval hemopoiesis, namely, blood formation in the kidney (mesonephros).

The extirpation experiments with frogs indicate that even here, where the spleen is practically the sole organ of hemopoiesis normally, it is not always essential to life; for its function may be assumed by any of the extensively vascularized areas of connective tissue; mesonephros, fat bodies or red marrow.

Finally, it may be stated on the basis of these three converging lines of evidence that the mesenchyme is the persistent mother tissue of blood; that the development of hemoglobin containing cells is related to an extensive sinusoidal vascular net-work; that the original blood mother-cell is a primitive lymphocyte; that the spleen, both embryologically and racially, is an organ which for a time best serves the needs of erythrocytopoiesis; that in higher development the red marrow offers a better location for this process, after which the spleen is abandoned and persists in a sense as an embryonic and racial vestige, with an erythrocytophagic function to be sure, but even this not essential in the presence of red marrow. From all of this emerges a working hypothesis which regards the lymphocyte as a relatively undifferentiated cell, with multiple developmental capacities, one of which is the capacity to differentiate hemoglobin in the presence of an extensive vascular net (possibly meaning relative predominance of CO_2 in the last analysis); further, that lymph nodes and spleen function in the formation of lymphocytes which in part are filtered out in the red marrow to differentiate into red blood cells. The ascription of both erythrocytophagic and lymphcytogenic functions to the spleen is not in contradiction of the conclusion that the spleen is an ancestral remnant, somewhat analogous to the vermiform appendix, for both of these functions can be assumed by marrow and lymph nodes in the absence of the spleen.

The spleen, then, is essentially an extensively vascularized mass of lymphocytes supported by a stroma of slightly differentiated mesenchyme, namely, the reticulum, which latter is also the mother tissue of the lymphocytes. The function of the spleen obviously inheres largely, if not exclusively, in the function of the lymphocytes. The presence of other large masses of lymphocytes, as in the lymph nodes and red marrow, presumably renders the spleen unnecessary, since its lymphocyte functions can be easily compensated for by hyperplasia of these other lymphoid areas. The outstanding functions of the lymphocytes are differentiation into erythrocytes, granulocytes and monocytes. The latter are essentially phagocytes. In the spleen, as splenic leukocytes or splenocytes derived in part also from reticular and endothelial cells, they digest effete red blood cells.

Though the normal function of the spleen appears of little essential consequence, under pathological conditions, as for example in leukemias and anemias, its disturbed functional activity produces, or at least accompanies, grave morbid conditions. In general these pathological conditions represent exaggeration

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of the normal condition, namely, excessive abundance or activity of the phagocytes, or excessive lymphocyte production with inability of commensurate differentiation, producing blood conditions characterized by the presence of large numbers of immature cells. The pathology of the spleen is very largely explicable in terms of its developmental and evolutionary history.

It is apparent that the questions of the significance and the function of the spleen involve very intimately the question of hemopoiesis, and that of the stimuli which effect a lymphocyte differentiation into erythrocytes, granulocytes or monocytes. Without further discussion of granulocytopoiesis and monocytopoiesis, it may be remarked that both granulocytes and monocytes develop also from reticular cells as well as from lymphocytes, and in part also from endothelium. This multiple origin becomes comprehensible when one recalls the close genetic relationship between reticular connective tissue, endothelium and lymphocytes. We are interested here chiefly in the matter of correlation between red cell production and the cellular and vascular conditions which obtain in the spleen. In other words, the question of the fundamental erythrocytopoietic stimulus presents itself.

We may approach this matter by looking for the common factor in the histologic conditions of those organs in which red blood cells are produced: yolk sac, mesonephros, spleen, liver, fat bodies of amphibia, red bone marrow. In all of these locations there occurs a relatively undifferentiated mesenchyme, namely, reticulum, the mother tissue of lymphocytes, rich in sinusoidal capillary blood channels. Another common characteristic is the relatively lethargic flow of blood through these sinusoidal vessels. Further analysis of these common conditions reveals the fact, in at least two of these organs, that there is a relative predominance of venous blood. This is effected in the case of the mesonephros, ontogenetically and phylogenetically, by the occurrence of a renal portal system; in the case of the liver by a definitive hepatic portal system. In the latter organ the venous (portal) blood constitutes approximately sixty per cent of the hepatic vascular content (MacLeod and Pearce, '14). This means a relatively large amount of CO_2 in these organs. Conditions in the mesonephros and liver differ, however, in that in the latter erythrocyte formation is almost exclusively, if not entirely a matter of further differentiation of hemoblasts in the slowly circulating blood of the liver sinusoids; while in the case of the mesonephros, it involves both origin and differentiation of hemoblasts. The obvious fact of the predominance of CO_2 in the liver and mesonephros suggests the prevalence of similar conditions in the yolk sac, spleen, fat bodies and red marrow. In these locations a relative CO_2 excess may result from the very fact of slow circulation through the sinusoidal channels. In the case of the spleen, the largely open sinusoidal circulation would be especially conducive to CO_2 accumulation.

This line of evidence suggests the conclusion that the hemoglobin containing cells, that is, the erythrocytes, developed primarily as a CO_2 carrier from the tissues to the surface no less than as oxygen carriers from the surface to the deeper tissues. Smith, Means and Woodwell ('21) have shown that approximately eight times as much CO_2 is carried by the red corpuscles, as by the blood plasma in man. Of course, in the last analysis the carbon dioxide-oxygen exchange is a unit process—carboxyhemoglobin and oxyhemoglobin are simply two aspects of the same mechanism—and the function of transporting CO_2 cannot be dissociated from that of transporting oxygen either functionally or developmentally.

With few aberrant exceptions red blood corpuscles occur only in vertebrates; lymphocytes (leucocytes) throughout the whole series of metazoan organisms. In the lower vertebrates the lymphocytes predominate among the colorless elements. For example, in the frog approximately 70 per cent of the leucocytes are lymphocytes, only about 30 per cent are granulocytes. Moreover, in vertebrates, red blood corpuscles appear coincidently with the segregation of lymphocytes in the form of a primitive spleen, as in the round-mouthed fishes.

We may picture the evolutionary process somewhat as follows: In all but the very lowest vertebrates, like the lancelet, the plasma was no longer able effectively to carry the increasing amount of CO_2 resulting from the increasing metabolic activity of the tissues of more active vertebrates, like the fishes, nor the necessary amount of oxygen required by these tissues. The presence of chemically unattached CO_2 in the plasma may be assumed to have supplied the stimulus under which the circulating

lymphocytes elaborated hemoglobin as a means for binding and transporting CO_2, and as the reverse aspect of the same functional process, the binding and transport of oxygen. Indeed, the evolution of higher vertebrates was fundamentally dependent upon the development of an increasingly more efficient CO_2 — O_2 exchange mechanism. Concurrent with this evolutionary process of the erythroblasts, proceeded the evolution of respiratory organs: gills, fins, swimbladder and lungs; and an evolutionary process in the erythrocyte itself, culminating in the non-nucleated erythroplastid of mammals. This most efficient oxygen and CO_2 vehicle appears abundantly already in one of the tailed amphibia (Batrachoseps attenuatus), where 95 per cent of the red blood corpuscles lack nuclei (Emmel, '23).

To return to the hemopoietic tissues themselves: At the evolutionary stage represented by fishes, the spleen as a segregated vascularized mass of lymphocytes became a more favorable site for red cell differentiation than the mesonephros, in spite of a renal-portal blood system in the latter. Red cell production became shifted to the spleen, renal hemopoiesis being subsequently almost exclusively a matter of granulocyte formation. It is conceivable that much was gained by freeing the kidney, with its specialized urinary function, from its accessory function of erythrocytopoiesis. We now arrive at the evolutionary level represented by the anuran amphibia. Here the spleen is practically the sole hemocytopoietic organ, combining the quintuple function of lymphocytopoiesis, granulocytopoiesis, monocytopoiesis, thrombocytopoiesis, and erythrocytopoiesis. Already, however, lymphocytopoiesis is beginning to be shifted to primitive lymph nodes, and erythrocytopoiesis for a brief transient period after hibernation to red bone marrow. In birds and mammals this shift has become complete, the spleen persisting as stated above, largely as an ancestral remnant.

The question then arises as to why erythocytopoiesis and granulocytopoiesis were given over to the red marrow and lymphocytopoiesis to lymph nodes. As to the latter, when we recall that lymphocytes function greatly also in the matter of phagocyte production, much is conceivably gained by having patches of lymphocytes, with generous lymphatic connections, scattered over the body rather than segregated in a single locus. As to medullary hemopoiesis, it may be emphasized that red marrow did not arise primarily as a hemopoietic tissue. It arose as a necessary adjunct of osteogenesis and essentially for the nutrition of the bones, and was only secondarily appropriated by the hemopoietic process. And it is only at that level when the bones become of such relative size, as in the amphibia, as to require for purposes of most efficient function hollow shafts, that bone marrow appears. Obviously, if a bone like the femur, even in amphibia were solid, it would be too heavy and cumbersome for efficient use, and its substance would be too thick for effective nourishment from the periphery.

This extensively vascularized marrow of the bones, with its mesenchymal stroma and its sinusoidal, largely open circulation, offered a favorable locus for the differentiation of circulatory lymphocytes within its area. Thus, apparently, almost as if by accident, the red bone marrow became the chief seat of vertebrate hemopoiesis instead of the spleen.

Such evolutionary evidence suggests that the lymphocytes produced in spleen and lymph nodes, in addition to other differential possibilities depending upon varying environmental stimuli, have the capacity, when filtered out in the red marrow, to differentiate, together with the lymphocytes (hemoblasts) originating in the reticulum of the marrow, under the stimulus of CO_2, into red corpuscles. Embryological evidence supports the same view.

If, then, the lymphocyte has the ability under specific embryological and racial conditions to change into a red blood corpuscle, it ought to be possible to find certain pathological conditions in mammals where this process actually takes place in certain tissues. Theoretically, such conditions should be certain of those where the red bone-marrow is diseased and incapacitated for erythrocytopoietic function. Here we would expect the spleen to revert in certain cases to its original embryonic erythrocytopoietic function, or that failing, for the lymph nodes to assume compensatory erythrocytopoietic function. In 1915 Citron reported two cases of "micromyeloblastic leukemia," in which the myeloblasts differentiated from lymphocytic cells of the lymph nodes. In 1922 Fineman reported a similar case which he diagnosed as "microlymphoidocytic leukemia." He concludes that here also, "In all probability the majority of the 'myeloblasts'

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and 'micromyeloblasts' of the blood were coming from the lymphoid organs." I now possess tissues, including lymph nodes, irradiated spleen, and marrow from a case apparently also interpretable as one of microlymphoidocytic leukemia, in which lymphocytes of the hyperplastic lymph nodes appear to be actually differentiating into erythrocytes. This case will be studied more intensively, and will be the subject of a later joint report. Its present interest pertains only to its confirmatory evidence to the conclusion deduced for embryological, normal histological, and evolutionary data as to a erythrocytogenic capacity of the lymphocyte, and to the significance of the spleen in so far as it represents a lymphoid organ.

LITERATURE CITED.

Austin, J. H. and Pearce, R. M., 1914. The Relation of the Spleen to Blood Destruction and Regeneration and to Hemolytic Jaundice. XI. The Influence of the Spleen on Iron Metabolism. Jour. Exp. Med., vol. 20, pp. 122-129.

Brill, N. E., 1924. Essential Hemorrhagic Purpura. International Clinics, vol. 1, pp. 32-40.

Carpenter, C. R., 1900. Splenic Extract and the Splenic Function. Med. Rec., vol. 57, p. 273.

Citron, J., 1915. Ueber zwei bemerkenswerte Falle von (akuter) Leukamie. Folia haematol, Bd. 20, S. 1.

Daiber, M. 1907. Zur Frage nach der Entstehung und Regenerations—fahigkeit der Milz. Jen. Zeitschr. fur Naturwiss. (Cited from Danchakoff).

Drzewina, Anna. 1905. Contribution a l'etude du tissue lymphoide des ichthyopsides. Arch. d. Zool. Exp., vol. 3, Series IV, pp. 145-338.

Downs, A. W. and Eddy, N. B. 1920. The Influence of Splenic Extract on the Number of Corpuscles in the Circulating Blood. Am. Jour. Physiol., vol. 51, pp. 279-288.

1922. Further Observations on the Effects of the Subcutaneous Injection of Splenic Extract. Am. Jour. Physiol., vol. 62, pp. 242-247.

Eccles, W. McA. and Freer, G. D. 1921 Enlargement of a Splenculus to Size of Normal Spleen. British Med. Jour., vol. 2, p. 515.

Emmel, V. E. 1924. Studies on Non-Nucleated Elements of the Blood. II. The Occurrence and Genesis of Non-Nucleated Erythrocytes or Erythroplastids in Vertebrates Other than Mammals. Am. Jour. Anat., vol. 33, p. 347-406.

Faltin, 1911. Finska lak-sallsk. handl., January (cited from Pool and Stillman).

Fineman, S. 1922. A Study of Micro-Lymphoidocytic Leukemia. Arch. Int. Med., vol. 29, pp. 168-220.

Hall, F. G. 1924. The Function of the Swimbladder of Fishes. Biol. Bull., vol. 47, pp. 79-117.

Harrower, H. R. 1916. A Further Note on the Therapeutic Value of Spleen Extract. Med. Rec., vol. 89, pp. 1000-1001.

Hirschfeld, H. and Sumi, I. 1924. Phagocytosis after Splenectomy. Klinische Wochenschrift, Berlin, vol. 3, p. 1361.

Hough, T. and Waddell, J. A. 1916. Blood Changes Following Hemorrhage and Perfusion. Am. Jour. Physiol. vol. 40, p. 1.

Johnston, G. B. 1908. Splenectomy (with Statistical Summary up to 1908). Ann. Surg., vol. 48, pp. 50-65.

Jordan, H. E. and Speidel, C. C. 1923. Studies on Lymphocytes. I. Effect of Splenectomy, Experimental Hemorrhage and a Hemolytic Toxin in the Frog. Am. Jour. Anat., vol. 23, pp. 155-187.

Jordan, H. E. and Speidel, C. C. 1924. The Fundamental Erythrocytopoietic Stimulus. Proc. Soc. Exp. Biol. and Med., vol. 21, pp. 399-404.

Krumbhaar, E. B. 1915. The History of Extirpation of the Spleen. N. Y. Med. Jour., vol. 101, pp. 232-234.

Krumbhaar, E. B. and Musser, J. H. 1914. The Relation of the Spleen to Blood Destruction and Regeneration and to Hemolytic Jaundice. X. Concerning the Supposed Regulatory Influence of the Spleen in the Formation and Destruction of Erythrocytes. Jour. Exp. Med., vol. 20, pp. 108-121.

MacLeod, J. J. R. and Pearce, R. G. 1914. The Outflow of Blood from the Liver as Affected by Variations in the Condition of the Portal Vein and Hepatic Artery. Am. Jour. Physiol., vol. 35, pp. 87-105.

Malpighi, M. 1686. Opera omnia. London. De liene 113.

Meyer, A. W. 1914. The Supposed Experimental Production of Hemolymph Nodes and Accessory Spleens. Jour. Exp. Zool., vol. 16, No. 2.

Pearce, R. M. and Pepper, O. H. P. 1914. The Relation of the Spleen to Blood Destruction and Regeneration and to Hemolytic Jaundice. IX. The Changes in the Bone Marrow after Splenectomy. Jour. Exp. Med., vol. 20, pp. 19-36.

Pool, E. H. and Stillman, R. G. 1923. Surgery of the Spleen. Surgical Monographs. D. Appleton and Co., New York.

Schonbauer and Sternberg. 1924. Regeneration of Spleen. Wiener klinische Wochenschrift. Vienna, vol. 37, p. 667.

Smith, L. W., Means, J. H. and Woodwell, M. N. 1921. Studies on the Distribution of CO^2 between Cells and Plasma. Jour. Biol. Chem., vol. 45, pp. 245-253.

Thiel, G. A. and Downey, H. 1921. The Development of the Mammalian Spleen, with Special Reference to its Hematopoietic Activity. Am. Jour. Anat., vol. 28, pp. 279-339.

Warthin, A. S. 1903. Contributions to Medical Research, Dedicated to V. C. Vaughan, Ann Arbor, p. 216.

Wiedersheim, R. 1907. Comparative Anatomy of Vertebrates. Macmillan and Co., p. 435.

CLINICAL CONCEPTION OF ANEMIA.*

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The conception of all forms of anemia as symptomatic maladies rather than disease entities encourages study of the underlying causes of a condition that is very commonly encountered in clinical medicine. Only three factors are concerned in producing anemia: (1) Loss of blood by hemorrhage; (2) destruction of blood by hemolysis; and (3) defective formation of blood on the part of the bone marrow.

HEMORRHAGIC TYPE OF ANEMIA.

Loss of blood by hemorrhage may be acute or

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chronic. Except when due to gross traumatism, it is seen most frequently in instances of bleeding from the rectum, stomach and duodenum, and in excessive bleeding from the uterus.

The symptoms produced by hemorrhage depend very largely upon the rate at which the bleeding occurs. With rapid hemorrhage there is a pronounced loss of blood-volume with sweating, restlessness, increased pulse rate and rapid, shallow breathing. When the blood-volume becomes restored, although the blood loss has been great, the patient has comparatively few symptoms while at rest.

The blood picture in anemia due to hemorrhage shows a low color index and the red cells appear pale, or achromic, for the reason that they tend to increase more rapidly than the hemoglobin. Immediately after hemorrhage the bone marrow becomes very active and this is shown in an increased leucocyte count which may reach 15,000, an increase in the number of platelets up to one million per cubic millimeter, and an increase in the young, or reticulated, red cells which may reach ten per cent. Nucleated red cells may also appear. The average size of the red cells may be a little smaller than normal, but true microcytes are not seen.

In chronic anemia due to loss of blood, it should be understood that the response of the bone marrow varies according to the duration, frequency and the amount of repeated blood-loss. Recurring hemorrhage over a period of years may finally discourage the bone marrow to such an extent that the blood may never return to a normal state.

Hemolytic Type of Anemia.

Anemia due to blood destruction is seen in the acute form in certain cases of sepsis, especially that due to the streptococcus; also in malaria, due to rapid destruction of the red cells by the plasmodium; and in certain cases of poisoning, such as that produced by potassium chlorate, acetanilid, nitrobenzol and trinitrotoluol. A subacute hemolytic anemia may occur in septic conditions of a more chronic type, especially those due to the streptococcus viridans, such as infectious endocarditis. Chronic hemolytic anemia is seen most commonly in the disease-entity, pernicious anemia, and more rarely in those instances of chronic hemolytic jaundice. It also occurs in varying degree in syphilis, in cancer, in infections with the fish tapeworm and in pregnancy.

In all hemolytic anemias, there is evidence of blood destruction in greater or less degree. The skin and conjunctivae show a yellowish color varying from a light lemon to a distinct jaundice. The spleen and liver generally show some enlargement, and pronounced splenomegaly is a feature of chronic hemolytic jaundice, associated with definite icterus but no bile in the urine. Slight, irregular fever is not uncommon, especially during periods of excessive hemolysis.

Evidence of blood destruction is also seen in the excessive liberation of iron which is deposited in the liver, kidneys and other internal organs. The excretion of urobilin is increased in the feces and urine, and a clinical method of measuring the degree of hemolysis has been suggested by the determination of the increased excretion of bile pigments in the duodenal contents. The presence of increased amounts of bilirubin in the blood plasma gives to it a definite jaundiced color and, if no biliary obstruction is present, this change in color of the plasma can be measured and a rough estimate secured of the degree of blood destruction. Histological evidence of blood destruction may occasionally be seen in the frequency of microcytes, tailed cells, fragmented red cells and shadow corpuscles.

Associated with the blood destruction there is a compensatory effort on the part of the bone marrow which results in abnormal blood formation. Extensive proliferation occurs and the marrow throughout is red, the fat being replaced by hyperplastic tissue. This pronounced activity of the bone marrow gives rise to the characteristic blood picture of all hemolytic anemias, but it is in pernicious anemia that the most typical histological blood changes are observed. These alterations from the normal consist of a high color index, macrocytosis, nucleated red cells, leukopenia and diminished platelets.

Many of the hemolytic anemias are definitely due to the effect of poisons or toxins, as seen in instances of acute or chronic sepsis, and in poisoning by certain drugs or chemicals. The etiological factors in pernicious anemia and in chronic hemolytic jaundice are quite unknown. In pernicious anemia, however, the constant association with a complete achylia gastrica, which has been shown in some instances to have preceded the blood changes by many years, probably gives rise to a secondary intestinal

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poisoning with the formation of a hemolytic toxin. Furthermore, spinal cord changes with involvement of the pyramidal tracts occur in about 80 per cent of all cases of pernicious anemia.

Quite recently, A. F. Hurst,[1] in England, and the writer,[2] in this country, have called attention to the constant association of achylia gastrica with combined sclerosis of the spinal cord, without the accompanying blood picture of pernicious anemia. These findings suggest very strongly that in true achylia gastrica a neurotoxin as well as a hemolytic toxin may be produced, the former having a special affinity for the posterior and lateral columns of the spinal cord, and the latter producing its effect on the hemopoietic system.

Aplastic Type of Anemia.

Anemia that depends upon defective blood formation includes the simple chronic anemias, chlorosis, so-called myelophthisic anemia and aplastic anemia.

Simple chronic anemia associated with defective blood formation occurs in various infections, in intoxications from diseases of the kidneys and liver as well as in poisoning from benzol, lead, mercury, etc., and in many chronic conditions, such as carcinoma, pregnancy, and in disturbance of the endocrine glands. The blood shows a low color index, the red cells are pale, or achromic, and show a tendency to be slightly smaller than normal; the white cells and platelets are normal or very slightly increased, and young reticulated red cells and nucleated red cells are not apt to be found. The patients with simple chronic anemia are pale and not yellow.

Chlorosis is a form of anemia occurring only in girls between puberty and full maturity. The exact nature of the disease is unknown, but it is supposed to be due to hypoactivity of the bone marrow. It is quite possible to conceive of some congenital deficiency of the hemopoietic system that is not capable of meeting the regular monthly blood-loss by menstruation over a period of some months or years, after which some compensatory adjustment occurs. The striking feature of the blood picture is the very low color index, with a hemoglobin percentage of 45 to 50 and a red count that is only slightly below normal. In other words, each red cell shows a pronounced reduction in its hemoglobin content. The leucocytes are normal in number or slightly reduced while the platelets may be slightly increased. Abnormal red cells are not found. It is important to remember that the girl with chlorosis is essentially healthy except for the anemia, and instances of tuberculosis, nephritis, myxedema and chronic focal infections should be excluded. Probably the most interesting fact about the disease, chlorosis, is that it is seen much less frequently nowadays than a few decades ago, and no satisfactory reasons have been advanced for this declining incidence of the "green sickness."

Myelophthisic anemia is the term applied to the condition in which the normal marrow tissue is crowded out by tumor formation. It occurs in both myelogenous and lymphatic leukemia, in instances of myeloma and chloroma and in metastatic growths. In an individual suspected of having malignant disease, the presence of many nucleated cells in the blood smears is very suggestive of metastases to the bone marrow. A marked reduction of the platelets may ensue, followed by a purpura hemorrhagica. In leukemia, especially, the involvement of the marrow may be so extensive that no normal marrow tissue may be found at autopsy and the blood picture becomes that of a typical aplastic anemia.

Aplasia of the bone marrow may occur without known cause in the form of a disease entity known as idiopathic aplastic anemia. In other instances, the aplasia is definitely secondary to some recognized cause, such as poisoning with benzol or trinitrotoluol. Occasionally aplasia occurs in overwhelming sepsis in which the marrow is poisoned directly, just as with benzol.

The etiology of so-called idiopathic acute aplastic anemia is unknown. It runs a progressive course to a fatal termination in from one to three months and occurs most commonly between the ages of 15 and 30 years. There is no evidence of increased blood destruction, and the gastric juice is generally normal in contrast to the persistent achylia gastrica in pernicious anemia. The patient appears pale and the sclerae are of a dead white color and never yellowish. Petechial hemorrhages and

1. Hurst, A. F., and Bell, J. R.: The pathogenesis of subacute combined degeneration of the spinal cord, with special reference to its connection with Addison's (pernicious) anemia, achlorhydria and intestinal infection. Brain, 45: pt. 2, 266, 1922.
2. VanderHoof, Douglas: The etiologic relation of achylia gastrica to combined sclerosis of the spinal cord. The relief of symptoms following adequate hydrochloric acid therapy. Arch. Int. Medicine, 32: 958, 1923.

bleeding from the mucous membranes give rise to the picture of a symptomatic purpura hemorrhagica, which is evidently dependent on the low platelet content of the blood in this disease. In addition to this striking diminution of the platelets, the red cells progressively diminish in number; show about a normal hemoglobin content, i. e., the color index is normal or but slightly reduced; polychromatophilia, stippling and nucleated red cells do not occur, and the white cells show a progressive leukopenia with marked diminution of the polynuclear and eosinophile cells. In other words, the blood examination gives a very clear picture of the progressive inactivity of the bone marrow with evident inhibition of the formation of all new marrow elements. At autopsy the bone marrow is no longer red in color, but shows practically complete fatty degeneration. Unlike true hemorrhagic purpura, with which acute aplastic anemia is sometimes confused, there is no favorable response to blood transfusions in the latter disease.

Finally, it should be understood that mixed types of anemia occur. A patient with a hemolytic anemia may also have bleeding hemorrhoids, or purpura hemorrhagica may occur secondarily either to sepsis, or to a blood disease, such as leukemia. The blood picture varies very definitely according to the functional state of the bone marrow. Therefore, it may be said that in between the anemias due to lack of blood formation, on one hand, and the conditions of pure blood destruction, on the other hand, occur mixed types where both hemolysis and an inactive bone marrow play their parts. Modern histological studies of the blood and hemopoietic organs, serum reactions, platelet studies, fragility tests, vital staining, chemical changes in the plasma and cells, and finally studies in the oxygen and carbon dioxide content of the arterial and venous blood, all these investigations are adding very materially to our conceptions of anemia and the diseases accompanied by changes in the normal blood picture.

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PULMONARY TUBERCULOSIS IN CHILDREN OF SCHOOL AGE.*

By CHARLES R. GRANDY, M. D., Norfolk, Va.

Some fifteen or twenty years ago, when I was young in tuberculosis work, I was rash enough to hazard the opinion that there were so few cases of pulmonary tuberculosis among children, that it need not be considered as a health problem. Of course, I have learned better long ago, but it is an interesting fact that none of my hearers at that time controverted my assertion, but let it pass unchallenged. Since this time actual experience has made me change my opinion, and I have recently verified it by a tabulation of the death records in my clinic for the last five years. The results obtained have been so interesting to me and so at variance with my old impression, that they may prove of interest to others and be of practical importance in public health work. And I may note here that my records now agree with the statistics gathered by Dublin of the Metropolitan Life Insurance Company and with those of the Census Bureau.

I have tabulated the deaths occurring in our clinic patients from pulmonary tuberculosis during 1920, 1921, 1922, 1923, and up to August 1, 1924. There were forty-three such deaths among our white patients and one hundred and forty among the colored. In school age, that is between six and twenty, there were four white deaths and forty-three colored deaths, or to put it into percentages, 9% of our white mortality occurred during school age, and 29% of our colored. If these percentages are true for the State of Virginia, we would have had, in 1922, 9% of our 1,464 white tuberculosis deaths, or 132 deaths among our white children of school age; 29% of 1,647 colored deaths, or 478 deaths among the colored; and a total of 610 deaths in the period when children are supposed to be at school.

As these figures are greatly in excess of what I thought true before I compiled them, it will be interesting to note that they correspond pretty closely with the Census Bureau figures for Virginia in 1920 and 1921, which give 445 and 464 deaths, respectively, between the ages of five and nineteen, the difference between our figures being largely due to the fact that there are many more deaths from tuberculosis in the twentieth year than in the fifth. It is also rather startling to find that there are more than twice as many deaths from pulmonary tuberculosis in children of school age than there were found typhoid fever for all ages, there being in 1922 only 266 deaths from typhoid. As our health departments are still expending their greatest efforts most success-

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fully against typhoid, it cannot be gainsaid that a disease that is killing more than twice as many children in the school age period is a problem which deserves the most serious attention on the part of our school an health authorities.

If we have this large mortality from pulmonary tuberculosis in children of school age, we must of necessity have many more active cases, who, associating closely with other and younger children, present a tremendous source of infection, but one which we apparently should be able to control more easily than when found in the general population. This is especially true among the colored people, where my figures show 29% of their total tuberculosis deaths to occur in this age period. This, by the way, is corroborated by statistics presented by Louis Dublin, in his paper, "Mortality from Tuberculosis among Wage Earners," which shows that deaths from tuberculosis among the colored occur much earlier than among the white people and that this mortality reaches its peak about the age of twenty. He also shows that between five and fourteen the tuberculosis death rate for colored males was more than ten times that of the whites, and for females eight times.

In our clinic work, which includes quite a large number of children, we have found certain differences between the patients in the two races, which may be of interest both theoretically and practically. There are one hundred and sixteen white children on our roll at present, but all, with the possible exception of seven cases, are distinctly of the juvenile type, that is the infection is apparently still in the bronchial glands, though these cases have all shown such symptoms as malnutrition, afternoon rise of temperature, frequent coughs, and weakness, and as a rule close contact with a positive case of tuberculosis. On physical examination we find a positive d'Espine sign, accentuated, harsh breathing, with increased voice sounds over one or both upper lobes behind, often associated with slight dullness, and at times with transient rales. When the rales, cough, and fever persist, and the child loses flesh and strength, we feel that the case is changing from a glandular to a lung involvement, which may develop into a distinct early adult type of tuberculosis, and from a practical standpoint become a bed or sanatorium case. Such are five cases, some four per cent of the total. Four of these were sent to Blue Ride Sanatorium and the fifth treated at home. All seem to be doing well at present. The sixth case is a little girl with persistent rales in the lower lobes, in whom the X-ray shows considerable peribronchial thickening and studding. The seventh case, a girl of eighteen, is an advanced adult type, who did only fairly well at Catawba.

This year we have had ninety-four patients of school age among the negroes. Of these I have classified sixty-five as belonging to the juvenile type, and twenty-nine, including five deaths, to the pulmonary types, which is thirty-one per cent, against a possible six per cent among the white children. Most of the pulmonary cases are of the distinct young adult type with upper lobe involvement, at times going into extensive cavitation. Two had rather acute conditions, primarily involving the lower lobe. One of these is dead and the other going down rapidly. Two of the younger children have a more chronic lower lobe involvement, one apparently having started in a spinal tuberculosis. A boy of twelve was first seen with the worst broken-down glands of the neck I have ever seen, along with involvement of the upper lobes. He died promptly. There is a marked difference in the resisting power of cases in this age group. Some apparently have no resistance at all, and this lack of resistance often seems to be a family trait. On the other hand, some children apparently have more resistance than any other age group in the colored race. We now have two children, aged twelve and eight, with large cavities. Both have been sent to the sanatorium, and both given bad prognoses when they were discharged. Still they both continue to live and the older one to improve in health, while adult sanatorium cases, sent home at later dates as quiescent or arrested, have already died, or are fast going to pieces. In this connection Dr. H. G. Carter wrote me, "I know that theoretically a child under sixteen years of age with the same amount of involvement in its lungs as an adult of thirty is not likely to improve, but it is our experience that we get better results from children from eight to sixteen than from adults." And I may add that it is our experience in Norfolk from these and other cases, that children, who have come home from Piedmont, continue to do better than similar adult cases. I have known children to get well

and stay well with large cavities, but cannot remember such an experience with a colored adult.

Now come the practical questions, "What are we doing to control this situation?" and "What else should we do?" I am merely going to try to answer them from my local experience, as I am not in a position to know what is being done in other cities, but other workers can take this and compare what they are doing with the work in Norfolk.

Let me first discuss the work among our white children, which for a number of years has been a main feature of the preventive work of the Norfolk Anti-Tuberculosis League. Let us suppose we have an underweight, delicate child, with a history of contact, of frequent colds and slight rises of temperature, but with only minimal demonstrable lung changes; in other words, what we formerly called a "pretuberculous" case, but now a case of the "juvenile type."

Such a case can usually be taken care of in a well run open-air school room, or even in an ordinary class room, if the teacher will cooperate, watch him carefully, see that his nutrition is maintained, and make him report regularly at the clinic. A case like this, as I have repeatedly pointed out, has no real lung involvement, but is almost always a case of infection of the bronchial glands, and as such has no sputum and is of no danger to the other children. Being a gland case and not a lung case, it is not necessary to report it to the health department. If, however, a case of this description does not do well, but the symptoms and signs increase, it ought to be taken out of school and put to bed either at home or in a sanatorium, for there is now danger that the gland case may be changing into a lung case, which for its own sake and the safety of others should be taken out of school.

During summer vacation children of this type should, if possible, be sent away from town and their weight and strength built up. The Anti-Tuberculosis League of Norfolk is able in the summer to care for twenty-five or thirty children, who still need special care, but who are not bed cases, at its cottage or preventorium, at Willoughby Beach. After such a summer the children are not only much better physically, but do much better work at school. They are nevertheless kept under pretty strict supervision, are made to report regularly at clinic, and possibly are sent back to the beach the next summer. At any rate, no child is discharged simply because it is doing well, but is kept under supervision for several years. We feel that this work is showing good results, which may account for the fact that all four of our deaths from tuberculosis in white children occurred in 1920 and 1921 and none in 1922, 1923, or 1924. This, however, may only be a coincidence, for I am certainly not sanguine enough to expect this record to be kept up.

I am sorry to say that our work among the colored children is not nearly so satisfactory, either in methods or results, though we hope to do much better this year as we are laying more stress on this feature of our work, and the schools are also able to give us better facilities. In the first place, we are not getting so many colored children for examination. This is partially due to the fact that we have not so much to offer the colored children, as we have no beach camp for them, and before this session had no open-air rooms in the colored schools. Then, it is much more difficult to find cases of the juvenile type among the colored children as the weight charts are made for white children, who normally seem to weigh less than the colored, and consequently are of much less value in finding cases of malnutrition among the latter. The other symptoms, too, appear later in colored people, it being quite common to find well marked physical signs of tuberculosis in a case with no loss of weight and just beginning cough and fever. In spite of this, we have nearly as many colored children as we can properly care for at our clinic and I am rather fearful of being swamped, when we begin aggressive work in the colored schools. In the white schools we say that a child with any two of the following groups of symptoms needs a physical examination:

(1) Children who are 10% or more below normal weight or have fatigue posture.

(2) Children who have frequent coughs or colds.

(3) Children who lack energy, tire easily, or have afternoon rise of temperature.

(4) Children who come from a tuberculosis household.

In colored children, till we can get a special weight chart for this race: (1) should read, "children who are below normal weight," in-

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stead of "children who are 10% under normal weight, for the weight and posture of the colored child is much better than that of the white child. The teacher or nurse should depend on her own observation rather than on what the child says, for a colored child always says he feels well, even if he has a good high fever, a headache and a bad cough. And finally, all doubtful cases should be referred to the school doctor or clinic for examination. In this way I believe we will get hold of most of our cases in the elementary schools, but it will call for work and a larger medical staff than we have at present. In the colored high schools the same plan may be followed, but it would be better to give each child a careful chest examination, so great seems the tuberculosis morbidity in this group.

Summary.

There are marked differences in tuberculosis in white and colored children. The white situation is being apparently pretty well controlled by a combined use of clinic, nutritional work, open-air classes, preventorium and sanatorium. The much larger morbidity and mortality among colored children show the need of more intensive work in the schools. Here a careful examination will allow us to get hold of the children long before they would report of their own free will, and at a time when many will get the best results from sanatorium treatment. When we realize that nearly a third of the cases of consumption in the negro can be found in children of school age and that we have twice as many deaths here as from typhoid in both races for all ages, we see before us a health problem of the greatest magnitude, and at the same time a new and perhaps simpler way of attacking it. The differences in the resisting powers make tuberculosis a different problem in the two races. Methods which have been found most efficient among white people, have not been equally as efficient among the negroes. The earlier morbidity among the latter points to the school as the place where our greatest efforts should be made to check tuberculosis among them. Here we have a great public health opportunity, which should allow us not only to reduce tuberculosis among the negroes, but also among the whites, with whom they come in such close contact.

Bank of Commerce Building.

CARCINOMA OF THE PENIS.*

By C. P. HOWZE, M. D., University, Va.

The purpose of this paper is to present an analysis of seventeen cases of malignant growths of the penis, treated at the University of Virginia Hospital during the past twelve years.

Tumors of malignant character involving the penis are usually carcinoma. Sarcoma is comparatively rare, there being only thirty-two authentic cases reported in the literature (Jolson). All cases in our series were carcinoma, the incidence of which is from 1 to 3 per cent of all cancers in the male (Ewing).

The course of the disease is insidious, and many cases run for several years before reaching a critical condition. In this series, there were two cases of three years' duration, in one of which there was no carcinomatous involvement of the inguinal glands. Local extensions occur late, due to the dense connective tissue protection surrounding the corpora cavernosa. These facts should make penile carcinoma a most favorable one for complete cure, provided the diagnosis is made during its incipiency. Unfortunately, the majority of cases which we have seen have been rather far advanced, and it does not seem amiss to call attention to the early symptoms, in the hope that the diagnosis may be made before there are local extensions of the disease and involvement of the inguinal lymphatics. Intelligent treatment applied early will result in a high percentage of cures.

In regard to etiology, we are still in the dark. There are, however, several predisposing causes, the most frequent of which in this series, as in other reported cases, is phimosis. In nine cases the first symptoms noted were irritation and discharge from under the prepuce. In most of these the foreskin had been adherent since birth. The presence of a foul discharge with phimosis in elderly men should always excite suspicion of cancer. The relative frequency of phimosis as a forerunner of cancer and the fact that Jews are practically free from the disease, is a most convincing argument in favor of circumcision. There were two cases dating the onset of the growth to circumcision which failed to heal. In a series of thirty-six cases reported by Barringer and Dean, eleven believed the growth resulted from

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circumcision. Thus, it would seem advisable that circumcision be done at an early age as a prophylactic measure.

The average age in our series was sixty years, the youngest being thirty years and the oldest seventy-four. The largest number, seven, occurred between the ages of sixty to seventy. There were six negroes and eleven whites in the series. Heredity seemed to play no part.

Only one case gave a previous history of venereal infection, which, from description, was a chancroid. Wassermanns were taken in only six cases, five being negative and one 2-plus. Barney in a series of one hundred cases had two with a definite history of a specific lesion, with the cancerous process beginning on the site of the chancre, while De Marquay records ten cases in a series of 59 and believes syphilis comes next to phimosis as a contributory factor. It seems that in some cases syphilis plays a part in the etiology.

There are two types of growth, (1) the ulcerative, with marked indurated base and edges, spreading rapidly, with tendency to destruction of the glans and invasion of the corpora cavernosa, and (2) the cauliflower or papillomatous. Nine cases were typically of the ulcerative type, while eight were of the proliferating group. In the long standing cases, it is rather difficult to determine the primary nature, as in the later stages the papillomatous type tend to break down and ulcerate. The type at onset is especially difficult in cases which have been obscured for long periods of time by an adherent foreskin. Both types metastasize with about the same frequency to the inguinal glands.

The location of the primary lesion was given as dorsum of the glans near the corona in six cases; the foreskin in four; in the region of the frenum in one; and in six it was undetermined, owing to the fact that there was an adherent prepuce and the growth had involved the entire glans and prepuce at the time of admission.

The early symptoms in nine cases were itching and discharge from under the foreskin. The longest period of time elapsing between these symptoms and admission to the hospital was three years. The average was ten months. Five noted small ulcers which gradually spread and three small warty growths on the dorsum of the penis. Two cases, dating the onset to circumcision, were of the epitheliomatous ulcer type. Of the late symptoms, hemorrhage was noted in two cases and one presented several urinary fistulae. In this case, there was entire destruction of the shaft of the penis with a carcinomatous ulcer and fistula at the peno-scrotal angle and bilaterial carcinomatous involvement of the inguinal glands. This was one of the earlier cases of the series, and was considered inoperable. In view of the recent advances in radium and X-ray therapy it is possible he could have been benefited by these measures. Unfortunately as in cancer elsewhere in the body, pain is a late symptom and occurs in only a small percentage of cases. The pain when present is usually lancinating in character. There was one case with far advanced carcinoma who complained of slight darting pains in the growth.

Thirteen cases, or 76 per cent, presented bilateral inguinal adenopathy of varying degree; three, or 17 per cent unilateral; and in one no glands were palpable. In only six cases are pathological reports obtainable on the glandular involvement. Of these five showed chronic inflammation with no carcinomatous invasion, while one was definitely carcinomatous. Of the remaining, six were grossly involved and four undetermined at the time of operation. It is readily seen from these figures, that the disease is slow in metastasizing to the inguinal glands. In the early glandular enlargement it is almost impossible to differentiate by palpation the hard indurated gland of chronic infection resulting from continual absorption from the infected growth, and that of metastatic carcinoma. The chronically inflamed glands show a marked diminution in size following removal of the primary growth by amputation. This was well illustrated by one case, admitted in poor condition, with a large indurated carcinomatous ulcer involving the entire dorsum of the glans and bilateral inguinal enlargement. The penis was amputated at the peno-scrotal junction without removal of the inguinal glands, and a complete recovery was made. There was a marked diminution in size of the glands following operation. Patient died two years later of pneumonia with no evidence of recurrence of cancer. It must be borne in mind, however, that diminution in size of the inguinal glands following removal of the primary focus does not rule out carcinomatous involvement, as in prac-

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tically all cases of metastatic growth there is an associated infection.

In only one case of this series was there noted any apparent involvement of the dorsal lymphatics, the primary growth having begun only three months previous to admission. It is especially noteworthy that this is the only case in which there was no enlargement of the inguinal glands. The dorsal lymphatics following the dorsal vessels could be palpated as fibrous cords for one and one-half inches. Following complete amputation of the penis, excision of glands of both inguinal regions, transplanting the urethra to the perineum, the patient is now symptom-free two and one-half years after operation.

As the inguinal glands are invaded by both pyogenic organisms and cancer cells, they occasionally undergo suppuration. This was seen in one case with a far advanced growth invading the entire distal third of the penis. There was a large indurated mass of carcinomatous glands in the left groin firmly fixed to the skin and underlying structures with several fluctuating areas over which the skin was quite reddened. Incision and drainage was followed by an extensive ulcerating growth similar to the primary one on the penis.

In no case was there evidence of metastasis to the pelvis at the time of admission. One patient died four and a half years following operation, apparently from carcinoma of the pelvic lymph nodes. At the time of death there were a number of indurated areas in the region of the prostate.

The method of treatment must be adapted to the individual case. In very early cases, amputation of the penis with extirpation of the inguinal glands will usually effect a cure, Barringer and Dean have recently reported a series of 36 cases, treated by radium and X-ray in conjunction with surgery, with excellent results. In cases showing no lymphatic involvement or inflammatory hyperplasia of the glands, they obtained good results without extirpation of the glands. Their results have been so favorable that they have adopted the following methods of treating the inguinal lymphatics:

(1) If no nodes are palpable, the groins are radiated and watched.

(2) If nodes are palpable, but thought to be only infectious, the primary focus in the penis is treated, and the groins radiated and watched.

(3) If the nodes are carcinomatous, and this diagnosis is hard to make, they are radiated, and then bilateral dissection done with radium buried along the lymph channels, either in the form of bare tubes or screened radium, the most important place to radiate being the lymph channels around the saphenous opening.

(4) If the nodes are thought to be infected and carcinomatous, the lesion on the penis is dealt with, and the source of infection cleared up before the inguinal nodes are touched.

(5) If the nodes are dissected out, the wound is partly sutured, and Dakin's tubes left in place, so that Dakin's irrigation may be employed until granulation occurs.

If we may assume that a period of three years of freedom from the disease is a criterion of cure, sufficient time has not elapsed in the cases of Barringer and Dean to justify any definite statement in regard to cures. It seems certain that radium and X-ray are to form important adjuncts to the surgical treatment in the future. In the light of our present knowledge, they should not supplant surgery but be used in conjunction with it.

In two cases of our series, simple amputation of the penis alone was performed; in one, an inoperable case, it was done purely as a palliative measure. This patient died two months later. The second case, previously mentioned, lived two years without recurrence. In twelve cases, amputation was accompanied by bilateral extirpation of the inguinal glands. In two of these cases, the entire penis was removed, and the urethra transplanted into the perineum. Of these twelve cases, in three instances no replies were received to inquiries. Of the remaining nine, one lived seven years, dying from local recurrence of the growth; one lived nine years, dying of heart disease; one died five years later of pneumonia; one, four years, with evidence of metastasis to the pelvic lymphatics; and five are now living seven and a half, five, four, two and a half, and two years, respectively, after the amputation. They are in good health and without any evidence of return of the disease.

The only case in which radium was used was in an extensive fungating growth involving both corpora cavernosa to the base of the penis. Four applications were made to the penis and inguinal glands with little or no improvement.

The patient lived six months. Two cases were considered inoperable at the time of admission. One lived three months and the second eighteen months.

CONCLUSIONS.

(1) Carcinoma is the most frequent tumor attacking the penis.

(2) The highest percentage of cases, 41 per cent, occur between the ages of sixty and seventy.

(3) The most frequent predisposing cause is phimosis, which was noted in 53 per cent of the cases.

(4) The presence of irritating discharge with phimosis should always excite suspicion of cancer in patients past middle age.

(5) Circumcision should be performed at an early age as a prophylactic measure.

(6) Metastases take place relatively late, the growth remaining localized to the glans or prepuce.

(7) The inguinal glands are involved by either infection or carcinoma in large percentage of cases—94 per cent in this series.

(8) The deep lymphatics of the penis may show involvement without superficial glandular enlargement.

(9) The treatment of choice is amputation of the penis with extirpation of the inguinal glands, followed by radiation. Radium and X-ray are important adjuncts to surgery in all advanced cases, and may prove to be the method of choice in certain selected cases.

REFERENCES.

Jolson: A Case of Sarcoma of the Penis. Boston M. and S. Jour., 1923, p. 715.

Ewing: Neoplastic Diseases. 1922. W. B. Saunders Co.

Barney: Epithelioma of Penis. Annals of Surgery, 1907, XLVI, p. 890.

Barringer and Dean: Epithelioma of the Penis. Jour. Urol., May, 1924, XI, p. 479.

DISCUSSION.

DR. CHAS. Y. BIDGOOD, Richmond: In treating carcinoma in any part of the body, one is dealing with the most serious of all pathological conditions, therefore one should use, in every case, all of the agencies available, except in those cases which are so far advanced that hope for cure is abandoned, and palliative treatment is the only course which is justifiable.

Carcinoma of the penis as a rule presents one of the most favorable types of malignancy. It is usually basal cell in type and metastasizes relatively slowly. When metastases do occur, they are in the dorsal lymphatics of the penis and in the glands of the groin and femoral canal, both of which are readily accessible to the surgeon, and the operation for this removal is simple. Therefore, I cannot agree with Dr. Barringer that these glands should be left in, radiated and watched in any case, except when the age or the general condition of the patient contra-indicates their removal. They should be removed surgically, and radium and X-ray used afterwards in all cases. To fail to remove the glands is courting disaster.

The cases in which Dr. Barringer advises against removing the inguinal and femoral glands are the early cases which present the best prognosis, and certainly one is more justified in being radical when there is a good chance for a cure than when metastases have occurred, and the prognosis is much poorer.

SOME COMMENTS ON SURGERY OF THE FEMALE PELVIS.*

By A. M. SHOWALTER, M. D., F. A. C. S., Christiansburg, Va.

By way of explanation, I wish to state my selection of the subject for discussion on this occasion is based on the fact that for years we have been taught conservatism in the surgical treatment of the female generative organs, and because of the fact that my experiences during the past fifteen years have warranted the conclusion that I personally have more often made the mistake of being too conservative in the removal of the tubes and ovaries than was apparently good for the patient's welfare, either physically or financially. This brings the question to my mind whether or not the pendulum has swung a little too far in the direction of conservatism from a viewpoint of the welfare of the patient, and from the standpoint of health. I do not wish to be understood as saying we should not use extreme caution and care lest we may become too radical in our treatment of the female generative organs, but I do wish to emphasize the point that had I been more radical in my surgical work I am convinced my patients would have had less operative experience, less financial expense, and enjoyed far better health in those cases of this type which I have had occasion to treat during the last fifteen or sixteen years.

It has generally been recognized for years that the human ovary has a double function to perform, namely, the formation of the ova cells and the production of hormones which have some rather vaguely understood physiological effect on the human economy. I am quite in accord with some of the views of certain authors, and agree with S. Goldberg, *Buffalo Medical Journal*, 1915-16 Vol. 71, page 173, when he states "The ovary, being an organ of such vital importance to the female economy,

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its operative conservation should be ever uppermost in the mind of the surgeon because of its three-fold function; the causing of menstruation, the secreting of ova and hermones." However, I am not fully convinced of his statement following this, namely, "There is no condition, mechanical or pathological, except extremely rare, in which the ovary is so thoroughly incapacitated from its normal functioning, but that some part of it may be conserved in the interests of the patient." I mean to say, in other words, that the conclusion above may be correct, but the question of a macroscopical distinction as well as a prophetic instinct to determine when a portion of a diseased ovary shall be left is one of the most difficult things confronting the surgeon in handling these cases. He further states: "The absence of the ovary destroys that normal hormone cycle of all ductless glands." This latter statement may or may not be correct, but as far as my experience goes it would not justify this conclusion.

Quoting from H. S. MacLean, *American Journal of Surgery*, Vol. 31, 1917, page 240, "We cannot explain the comparatively abrupt cessation of menstruation at the menopause on any known histological or physiological basis." And, again, "A conservative operation may always be supplemented by a second; a radical operation can not." Quoting from the same author again, he states "Gordon, in his study of 112 cases, brings out some very interesting facts. In 34 of his cases double oophorectomy was performed for *vague* disturbances in the abdomen, together with a train of indefinite nervous symptoms. None of these patients was permanently benefited. Nine showed an immediate improvement in the pre-existing functional disorders, but shortly thereafter the former conditions returned. In 75 cases, complete hystero-oophorectomy was performed. The removal of the diseased organs removed the localized discomfort but in the months following the operation, symptoms of a more distressing character began to develop. In the large majority the former nervousness not only remained but became accentuated." Among his conclusions, the following may be quoted: "As in the removed organs healthy portions of tissue were invariably found, it is to be supposed that the removal of the latter is in some relation to the morbid phenomena observed after the operations. The logical conclusion seems to be that one must be very cautious in advising operation on the generative organs and the tendency should be to oppose as much as possible the removal of any amount of normal tissue found in the uterus or ovaries. No operation should be advised on healthy organs if a woman complains of *vague* nervous symptoms." * * * "It has long been the contention that while it was right and proper to practice conservatism when dealing with diseased ovaries alone, there is no use in considering the ovaries or in making any special effort to retain them or any portion of them when the uterus is removed, as the latter operation effectually terminates menstruation and renders the ovaries useless and negligible. It is believed that surgical judgment has been bad in these cases, and has been contrary to what we can assume to be the character of the ultimate ovarian function. If we cannot be absolutely certain that the ovaries have no function beyond ovulation and menstruation, we must not sacrifice these organs as a matter of expediency or because their removal is a feature of a well-developed technic." Again "In hysterectomy for uterine diseases, both the ovaries are invariably left, irrespective of the patient's age, unless they are so badly diseased as to be a menace to the patient's health. The mere fact that an ovary contains one or more cysts is no reason for the removal of that organ." Concluding his remarks, he states: "The fact that the nervous and mental symptoms following artificial menopause are apt to be more violent and more lasting than those following the normal menopause is additional evidence that the ovary has been concerned in something else besides ovulation and menstruation."

Falta Myers, in his book on "Ductless Glandular Diseases," calls attention to the well-known fact that removal of the uterus and leaving the tubes and ovaries or any portion thereof intact, is often followed by the usual menstrual disorders or molimina of headaches, backaches, and nervous excitation.

From the above quotations which, generally speaking, I believe are accepted as true by the majority of the medical profession, I am inclined to believe that, based on my own experience, there is a frequent mistake made in too conservative surgery of this type.

By way of comparison of the results above referred to in the high percentage of unfavorable symptoms following surgery of this type, I wish to call attention to some operative work performed in the New Altamont Hospital, at

Christiansburg, Virginia, during the past fifteen years. These reports cover operations on 229 cases, divided as follows: supra-vaginal hysterectomy 53, pan-hysterectomy 12, A. R. L. S. 100, ectopic pregnancy 3, Caesarean section 11, operations on tubes and ovaries 63, subperitoneal fibroid of uterus 1, ligation of tubes 2, and D. and C. and Bassini 1. Thus, there were a total of 246 operations on the above mentioned number of cases, the name of operation being the chief surgical condition for which the operation was performed. In the majority of these cases there were further operations performed at the same time, such as removal of the appendix, removal of varicose veins of the ovary, and a suspension operation, but my idea in giving the number of operative cases rather than the number of operations performed in detail is to determine the frequency with which operations on the female pelvis are likely to recur. By further analysis of these cases, I find there were 13 of these patients who had a total of 30 operations performed; in other words, 17 additional operations being performed on 13 of the 229 cases, which show a percentage of reoperative work of 13 out of 229, or 5.6 per cent. By a further look into the nature of the cases that were reoperated on, the primary operation was for some trouble with the tubes and ovaries, such as pus tubes, degenerated ovaries, displaced uteri, and Caesarean section (two cases), which goes to show the further interesting point in that the 13 cases upon which the 17 additional operations were reported were included in the 177 cases covered by suspension, ectopic pregnancy, Caesarean section, operations on the tubes and ovaries, for various indications, being a percentage of 13 operative cases in 160 patients, with 17 additional operations performed, or a 8.1 per cent of patients, and 17 additional operations out of the series of 177 operations, a percentage of 9.6 per cent. And now by a further study of our operative records, we note that in the hysterectomy cases, either supra-vaginal or complete, the removal of the tubes and ovaries was done in every instance, and the average age of the hysterectomy patient was 39, minimum age 16, and maximum age 66. These 65 patients upon whom there was done hysterectomy, together with removal of the tubes and ovaries, were operated on during the period from April 13, 1909, to June 3, 1924. Our follow-up records show there were nine deaths, of which number five occurred shortly after the operation; two from acute dilatation of the stomach; two from shock, and one from general peritonitis. The other four deaths occurred at periods ranging from one to several years following the operation; one from recurrent carcinoma, and three from influenza or some of its complications. This gives us a record, during the period specified above, of 56 hysterectomy cases in which the tubes and ovaries were removed, that are living to date and report that they are enjoying good health. With the exception of one case which was reoperated on twice following a hysterectomy to sever adhesions, our records show that none of these patients have had to call on us for further operative treatment since the complete operation was performed. The patient who was the single exception, has been enjoying the most perfect health since the last operation in 1913.

As the patients who had this operative work performed seem to be enjoying the most perfect health as a whole, are free of all nervous symptoms, and apparently are suffering no ill consequences of any kind, it brings the question forcibly to my mind, as I am sure it will to yours, to what extent can we accept the report above referred to from H. S. MacLean in 75 cases of the same type in which hysterooophorectomy was performed, when he frankly states there was some immediate improvement of a local nature but symptoms of a more distressing character soon began to develop? Certainly this has not been my experience—in fact, far from it.

Although I heartily condemn the indiscriminate removal of healthy tubes and ovaries, I am frank to bring the issue squarely before you, since the question of determining *when an ovary should be removed, or a tube, or a uterus*, when some one of the pelvic organs has become involved, is to my mind a far greater question than most of us realize. While the logic of our instructors seems to be almost conclusive from a theoretical stand-point, as shown above, it does not work out practically in the Alleghany mountains where I have been doing my work. The question squarely confronts us when we are dealing with diseased tubes and ovaries and uteri, to what extent should we subject our patients to the discomfort and uncertainty of relief and future health by patching up already diseased organs? Although a small part of these organs, as men-

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tioned by Goldberg, may be apparently healthy at the time of the operation, the question for every surgeon to decide in a case of this kind is how long will they remain in good condition and the patient enjoy good health?

I trust I have not permitted the pendulum of conclusion to swing too far in the opposite direction to have an unfavorable influence on the minds of you gentlemen present, but I hope to bring forward for discussion the question: When should uteri, tubes and ovaries be removed, and when not? Also, what are the end results of removal, and whether or not we have overestimated the damage done by removal?

IDEAS IN SYPHILOLOGY.*

By T. LATANE DRISCOLL, M. D., Richmond, Va.
Associate in Syphilology, Medical College of Virginia.

I hesitate to give my ideas on an already overburdened subject, but it would seem that certain factors of a most disconcerting nature occurring in the routine practice of syphilology might be eliminated. Foremost, among these we might mention the Wassermann-fast case, so-called, and by this I assume a negativity of all things, palpably so, except blood. Before it is possible to scientifically advise a remedy, certain fundamental factors, as to etiology, must be taken into consideration. Concisely put, what causes a persistent positive Wassermann in such cases, or is there actually such an entity? First, we must concede in the light of voluminous work that a positive Wassermann is indicative of syphilis in the majority of instances, and its persistence, as in the Wassermann-fast case, is indicative of a syphilitic process, not simply a condition that must be tolerated or actually neglected. Is there such an entity? We believe not. On the contrary, we assert that it is a drug-fast, instead of blood-fast incident. As to the direct causes, it would seem by a study of case histories and the disappearance of clinical phenomena, and, under certain conditions, serology, the following factors enter into this: Persistence in treatment beyond a point at which tolerance has been established for well-known drugs, or else there is a process of drug administration that would tend ideally to develop tolerance.

Under certain circumstances, it would seem that after about eight or ten injections of arsphenamine the patient becomes tolerant, as evidenced by the slight if any clinical result had, and, if continued beyond this point, apparently little if any serologic results are to be noted. From directions, and in medical literature we often read of increase in dosage as the treatment proceeds. This, we believe, is the ideal method for developing a tolerant arsenic case. Certainly if the instructions were absolutely reversed it would be more nearly accurate. It is not my desire to limit this statement to arsenic, for to be included are mercury, iodides, bismuth, and other drugs, any of which may develop tolerance. It is eminently wrong, however, in thinking of a persistent positive Wassermann, to forget the possibility of a focus of infection, as it is common to have a blood become negative after a positive spinal fluid has been cleared up.

Primarily, this work was inspired by a patient who had been given ninety-two injections of arsphenamine at one of the clinics, and who serologically was positive for both blood and spinal fluid, with a rather definite psychosis manifested by constant depression, with occasional ideas of persecution, and many of the so-called neurasthenic symptoms. We suspected incipient paresis, yet found it difficult to explain how a patient with such an enormous amount of treatment, in spite of the fact that no focus of infection had been determined could present such a condition. Why does this patient respond to other treatment which is concededly not so potent as arsphenamine?

The following case suggested focal infection, as no one would likely suspect drug tolerance from the history: C. S. M., age 41, male; white, American, machinist. The chief complaint was melancholia. Had a venereal sore about fifteen years ago, when there was also a generalized rash and sore throat together with pain and stiffness in back and legs. The general appearance of the patient indicated undernourishment. There was also generalized lymphadenopathy. Examination of the nervous system showed that the left knee jerk was markedly reduced, while the right was slightly reduced. There were positive Romberg; Argyll-Robertson pupils, severe shooting pains in legs, and indefinite ataxic gait. Gastric crises occurred, and there was occasional diarrhea, which was apparently unexcited by food stuffs. Mentally the patient was markedly depressed.

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The serologic findings showed a positive Wassermann, both for spinal fluid and blood. The diagnosis was syphilis with a neuro-involvement which presented the symptom-complex of tabes dorsalis. Treatment up to the time the patient was referred to me by Dr. J. W. H., included eleven injections of neo-arsphenamine and fifteen injections of trepol. Blood and spinal fluid both gave a positive Wassermann at that time. After giving the patient six intraspinal treatments which I began on June 17th, the spinal fluid and blood were examined and proved negative.

The next case showed an enormous tolerance for arsenic: C., age 26, male, white, Italian, street car conductor. The chief complaint was "nervousness." Has had a venereal sore for the past five years. No history of a generalized rash, although there has been a generalized lymphadenopathy. Appearance indicates the patient has been fairly well nourished. Nervous system, reflexes slightly increased. Patient is very restless, and at times very much depressed, fancies he has no friends, and that the doctors will not get him well. The company has it in for him. Can't sleep, everything wrong, and nothing very definite. Serologic findings—positive blood and spinal fluid. Diagnosis—syphilis with a neuro-involvement and symptom-complex of paresis. During treatment for a period of about three years, patient was given seventy-two injections of arsphenamine in a Boston clinic. In our clinic at the Medical College of Virginia, he was given twenty, making a total of ninety-two injections of arsphenamine. At that time he was unimproved. Patient was then given sodium iodide and mercurosal twice weekly for about two months, and bismuth for one month, at which time he had a negative blood Wassermann. He showed marked improvement mentally and physically, and was able to resume work. Patient lost sight of.

The following case seemingly acquired a tolerance for arsenic by increasing the dose too gradually, beginning with a very small amount of drug. This case was worked out with this in mind, and proved to be most embarrassing because of the difficulty encountered in actually causing a disappearance of the lesion: R. T., age 28, male, white, American. Insurance business. Chief complaint—ulcer on penis in sulcus extending over corona to glans. Treponema demonstrated with dark fluid. No secondary rash or systemic manifestation other than enlarged inguinal glands. In treatment of this patient, he was first given five centigrams of arsphenamine. The following day there was apparently some change in chancre, and it seemed to be much dryer, and more friable with no discomfort. One week later the chancre was almost double size. One decigram of arsphenamine was then given. Three days following, lesion was much better, there being a lessened induration and distinct healing. One week later the patient was given one decigram of arsphenamine. No apparent effect on chancre. The following week three decigrams were given with, to my surprise, a rapid extension of lesion. Three days later four decigrams of arsphenamine were administered with slight if any results. One week from that date six decigrams were given, the lesion showing a tendency to heal. Following that, at a time when the patient was becoming anxious about his condition, the tartro-bismuthate of sodium and potassium was administered in one decigram doeses for four injections, a smooth cicatrix resulting.

Conclusions.

Basing my deductions on the study of three hundred syphilitics, it would seem that a Wassermann-fast blood is in reality a drug-fast condition. The means of preventing this is to limit the amount of any single drug given.

In the administration of arsphenamine, which is our most active treponemicidal agent, a maximum dose should be the initial dose, due consideration, of course, being given conditions constituting contraindications.

And, finally, the cerebrospinal system should be looked upon at all times as being potentially a focus of infection.

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SYPHILIS—A PREVENTABLE INFECTION.*

By DUDLEY C. SMITH, B. S., M. D., University, Va.
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When workers in preventive medicine begin the task of eradicating a disease they ask the clinician and scientific investigator for certain information. They need to know: First, the cause of the disease; second, if an infection, how the causative agent is transmitted; third, accurate methods for early diagnosis; and

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fourth, efficient therapeutic procedures. When this information is given, they feel confident that the disease can be successfully combated.

It is a striking thing in the history of medicine that all the above facts in regard to syphilis have been known for more than a decade, yet the disease seems to be almost as prevalent as before. The only conclusion it is possible to reach, then, is that these facts have not been generally applied.

The cause of syphilis is the treponema pallida. It is communicable by direct contact with an infected person or object. Clinical acumen, darkfield examinations, and Wassermann tests make early diagnosis possible. Administration of available anti-syphilitic drugs quickly makes the infected person noninfectious; and if administration is prolonged sufficiently the vast majority of those infected, who are likely to transmit the disease, are cured.

The apparent failure to control this malady is ascribed to its sexual aspects. It is more difficult to control an infection transmitted directly from person to person, than one transmitted by an intermediate host, especially when there is added a moral question. For this reason prevention of venereal diseases presents difficulties, but with the knowledge at hand syphilis can be eradicated. It is not essential that the peoples' sexual habits be changed; however, the task can be made easier by improving the sexual standards of the population. A person who does not harbor living treponema pallida cannot transmit the organism to a second person.

The prevalence of syphilis and its serious consequences justify urgent and efficacious preventive measures. Syphilis is one of the largest problems in public health work. The incidence of syphilis varies in the different groups of the population, the estimate, based on Wassermann surveys, varies from five per cent in young apparently healthy adults to fifty per cent in prostitutes. It is conservatively estimated that eight per cent of the population in this country are infected; that is, there are about two hundred thousand syphilitics in Virginia. Stokes speaks of syphilis as the Third Great Plague. Hazen estimates that the total economic loss in this country due to syphilis is half a billion dollars a year. On a basis of population, Virginia's share of this is ten million dollars annually. This includes loss of time from occupation, money spent by infected individuals and amount invested in institutions for the handling of those made invalid in mind or body by this malady. The price paid in mental agony is inestimable.

Heretofore, medicine in its combat with syphilis has followed a defensive policy. It is now time that the strategy be changed; instead of awaiting an attack, a vigorous offensive should be begun. Sir David Bruce's remark concerning preventive medicine in general is especially appropriate here. "Instead of remaining quietly in the dressing stations and field hospitals waiting for the wounded to pour in, the scientific services must be well forward in the enemy's country, destroying lines of communication, aerodromes, munition factories, and poison gas centers, so that the main body of the army may march forward in safety."

No attempt will be made here to offer a complete program for the eradication of this disease. A general outline with a few special remarks will suffice. In brief the problem is summed up as follows: (1) Finding all those infected; (2) making them noninfectious, and (3) instructing the well how to prevent infection.

An awakening of public opinion is primarily and essentially necessary. One of the main factors in overcoming yellow fever, smallpox, typhoid fever, and certain other diseases has been the widespread knowledge in regard to them. When any disease receives universal publicity it loses much of its ability to spread. When a population learns what causes a disease, how it is spread, and something about combating it, the disease then becomes less prevalent or in certain instances extremely rare.

Because of the facts—namely, that syphilis is usually transmitted by sexual contact, oftenest by immoral conduct; is looked on more as an indecency than as a disease; and conversation in regard to it is tabooed—it has been difficult to enlighten the public. One of the few good things that came out of the World War was increased publicity concerning venereal diseases. The laity should be taught to think of syphilis as a disease just as pneumonia is a disease, and to talk plain matter-of-fact English about it. Nothing has done so much for the campaign against tuberculosis as the unloosing of tongues. The facts in regard to

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syphilis can be made to appeal to men and women as worthy of their serious attention. They should be taught something about the history, prevalence, etiology, clinical course, diagnosis, prophylaxis, and treatment. The teaching can be done through all the numerous channels of individual and public instruction. Some of the channels are homes, schools, churches, public addresses, moving pictures, and radio, pamphlets, and newspapers.

With the background of an enlightened public it can be recommended that every member of every household have a routine health examination including a Wassermann test. Physicians should do a Wassermann on every patient they see; this is especially indicated in urological, obstetrical, neurological, dermatological, orthopedic, and circulatory cases. In hospital practice it is surprising how many unexpected cases of syphilis are picked up by the routine Wassermann test. In this way a large percentage of chronic cases will be located. At present the acute infectious are detected fairly early, but better training of all physicians will hasten the diagnosis.

Since a large percentage of all infections are transmitted by professional and clandestine prostitutes every effort should be made to locate them.

After locating the infected individual the next step from public health standpoint is to make him noninfectious. This is accomplished by early vigorous treatment and voluntary isolation in most cases, forced isolation in others.

Because of the enormousness of the task of finding and treating all syphilitics, complete eradication will not be readily accomplished and every available means of preventing new infections should be employed. It is readily admitted by everyone that high moral standards should be encouraged. Improving the mind, character, body, and environment of each member of society will raise the moral standard. This sociological phase of evolution is a slow process. Under present conditions it seems that from a scientific standpoint it should become general information that there is an efficient prophylaxis for syphilis if it is used soon after exposure.

The problem of treating all those infected so that they are made noninfectious, as well as to restore them to normal, presents several difficulties. It would be an impossible task for public institutions and syphilolographers to undertake. Besides a large number of those found to be infected would not visit either of these. The treatment must then be done by all those practicing medicine. An essential is for all physicians to equip and train themselves to treat syphilis properly. It would require only a short course of instruction to teach the average physician the proper technique. Research in connection with the substances used in treatment, has simplified the administration until the difficulties and dangers are minimal. A specific recommendation is that short intensive courses in syphilology be given in each county of the state.

SUMMARY.

The cause of syphilis is known; its methods of transmission have been determined; accurate diagnostic methods are in use; and efficient prophylactic and therapeutic measures are available. Widespread use of this knowledge will diminish the incidence of syphilis, and in time will make it a rare disease.

NEURO-VASCULAR SYPHILIS.
A Case Report With Remarks.*

By THOMAS W. MURRELL, M. D., Richmond, Va.

In the fall of 1921, Mr. Blank, age fifty-six, mechanical engineer by profession, found that he was losing weight. He noticed, at the same time, a slight impairment in his efficiency, which he attributed to overwork. His normal weight being one hundred and fifty, he, at this time, weighed one hundred and thirty-five. In November of this year, he laid down one afternoon for a nap and waking, was astonished to find he had lost his voice. His voice, which was normally a deep and resonant bass, was now a husky whisper. Feeling that this was due to a cold and nothing serious, he did not seek treatment.

Shortly after, while dining in a restaurant, he was seized with a violent fit of coughing and, turning to one side, leaning over in an effort to control it, he lost consciousness; falling to the floor, he struck his head, causing a slight gash on his forehead. He was taken to a local hospital and remained there for several days. The routine examinations, made at the hospital, revealed a four plus Wassermann. He was advised to return home, and referred to me for treatment.

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When I first saw him, he was in good spirits and feeling well, the only disturbing factor being loss of voice. Before instituting treatment, I asked Dr. John Dunn to make an examination of the larynx. He reported about as follows: The entire right vocal cord was completely paralyzed, the left side being unaffected. From his examination, Dr. Dunn felt that the syphilitic deposits, causing the paralysis, were on the nerves at their exit from the skull, since there was no evidence of meningeal irritation, or of choked disc.

The patient was started on neo-arsphenimine, six decigramme doses, and sixteen treatments were given at weekly intervals. Improvement commenced when we were half through this. He was then put on sodium iodide, two grammes intravenously, every other day, until twenty doses were given. At the completion of this course, his voice was about two-thirds returned, and he was again examined by Dr. Dunn. Dr. Dunn reported that the right vocal cord was still paralyzed but that the gap had been largely closed by the left cord coming over and that he found a most satisfactory result had been obtained, but doubted whether further specific treatment would be helpful.

My patient, being a man of excellent intelligence, I at all times discussed the case with him, and advised that since there was not the slightest evidence of harmful action from the drug, and the possible chance of good, I would retrace the course of treatments. His agreeing to this, an intermediate course of mercury and potassium iodide was given for one month, when we started again with neo-arsphenimine, giving sixteen treatments and repeating the sodium iodide for ten treatments. This brought us up to April 26th, 1923. Two weeks later a spinal puncture was done and, on receiving a negative report of the examination of spinal fluid, his blood Wassermann, having been negative for over a year, and his voice now returned to normal, the case was discharged as cured on this date.

On the first day of April, 1924, eleven months later, Mr. Blank came in my office in a great deal of distress; his left arm was oedematous, including his shoulder and left side of chest; the upper left thorax was marked by distended veins, and the oedema of the left hand was so great as to prevent his closing it; the whole picture being one of obstructed venous return of the left arm.

Dr. A. G. Brown was immediately called in. By palpation, he outlined a mass in the chest, but by auscultation could not detect a brue. He advised X-ray, which was done by Dr. Fred M. Hodges. Dr. Hodges reported as follows: (April 2, 1924).

"I fluoroscoped this man first and, finding what I took to be an aneurysm of the aorta, made plates of the chest only. The lungs are clear, the heart is markedly enlarged, the entire aortic shadow is widened, and there is in the area of the descending arch a large mass which pulsates, and which appears to be part of the aorta. I believe that this is an aneurysm. It is possible that this could be a malignant growth in a patient who has a dilated aorta, but I do not think so."

A Wassermann taken at this time was negative and the patient was put in the hospital with absolute rest. After one week of this, the administration of neo-arsphenimine was again instituted, giving small doses at first, and in two weeks getting up to six decigramme doses. After eight treatments, the patient felt much better and seemed normal, so Dr. Hodges was asked to take a second X-ray, which he did on May 24th, 1924, nearly eight weeks later. Dr. Hodges reported as follows:

"At this time the shadows noted in the mediastinal space have practically disappeared, and I feel sure that all that he has is a diffuse aneurysmal dilatation of the aorta with almost a sacculation at the point of the descending arch just at the left of the sternum. I feel that this condition has certainly improved, and that there is no other pathology present."

On May 25th, an X-ray treatment was given to his hands for what was apparently an eczema, which had developed in the last month or two. This eczema was typical, occurring on the dorsal surface of the fingers, and was helped by the X-ray treatment. We went forward with the treatment, giving eight more neo-arsphenimine. We had now arrived at the point where we were two years ago. Should treatment be continued since it was apparently harmless, and so much good was being obtained, or should we rest? The patient stated that he was feeling better all the time, and it was decided because of this to go ahead.

After three treatments, however, his hands, which were typically eczematous, became inflamed and apparently changed to that of a dermatitis. This spread rather rapidly up the

arm and the left side of the face became involved. I then awoke to the fact that I was confronted with an exudative erythema type of dermatitis due to arsenic.

Immediate treatment with intravenous injections of sodium thiosulphate was started, the first dose being given on August 9th. The condition, however, spreading so rapidly, the patient became alarmed, and desiring consultation, was taken to Dr. John A. Kolmer, of Philadelphia. Dr. Kolmer gave him four treatments of thiosinamine and reported on August 15th:

"No more new lesions are developing and the old ones are beginning to dry and disappear. I know that you will be very much relieved to hear of the outcome and I believe that Mr. Blank has had a rather close call."

The patient returned to Richmond on August 19th. One week later there was a relapse of his condition and not having thiosinamine, the thiosulphate was started again and from August 26th to September 27th he received twelve doses of thiosulphate. By this time, the lesions had all disappeared as inflammatory areas, leaving a few hyperkeratotic spots and a slight itching. In every other way, the patient seems entirely well.

Remarks.

We will consider this from three phases:

Nerve Involvement: It is, of course, debatable whether the repetition of the treatment, after Dr. Dunn saw him the second time, was necessary to produce the excellent result obtained in voice restoration. It is a fact that improvement was continuous during this period, and complete restoration not affected until the second course of treatment was completed. It is interesting to know that such paralysis could take place from extra-cranial involvement, since all examinations, including spinal puncture, did not show any central nervous system involvement.

It is also possible that this paralysis was due to the interference with the nerves by the mass in the chest. It is hard to understand, if this be so, why such a long treatment was ineffective with a condition which had not developed to the point of causing local symptoms, while later on one-fourth of the amount of treatment was sufficient to control it when the chest condition had reached a climax.

Vascular Involvement: The patient states that for many years he has had no pulse in his right arm, and it was always a little joke with him, in years gone by, if sick and consulting a physician, to give him this right arm to count the pulse. The only possible time of infection from local evidence was ten years previous to his first visit, and the absence of pulse in the right arm had been noted many years before this.

Of course, the first consideration here is the question whether the mass in the chest was an aneurysm or not. If it was not an aneurysm, it must have been a gumma. It is most unusual for a gumma of this size to develop one year after an unusually intensive treatment, and with a negative Wassermann. In addition, the patient's work at this time was such as to promote the occurrence of the aneurysm. He was now fifty-eight years of age, and undertook some work which would have been exceedingly strenuous for a young man in normal health. If there was an aneurysmal dilatation, did rest restore him, or did the specific treatment do the work? These questions are to be answered by the internist. The facts are as stated.

Skin Involvement: In past years I have seen, and am fully acquainted with, the pigmentation of the skin and the hyperkeratosis due to the prolonged administration of arsenic. In the several thousand arsphenimine administrations seen in private and dispensary work, I have also become familiar with the different reactions of the drug. The cases of exudative erythema have always come on after a few injections of the drug, and are due to the chemical combinations, which we term arsphenimine.

This reaction was arsenical dermatitis. In three years' time this man had received fifty injections of neo-arsphenimine, and the condition must have resulted from a reduction of the drug in the body and the storing up of the arsenic in the tissues. I can assert with assurance that the original condition of the fingers was an eczema, since it was typical in appearance and yielded to treatment for this condition. If this be so, then it is true that arsenic dermatitis can be grafted upon, or started from an eczema, and that a patient with an eczema who is under prolonged syphilitic treatment, should be watched from this angle.

17 *East Grace Street.*

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RADIUM THERAPY IN UTERINE HEMORRHAGE.*

By J. MOREHEAD EMMETT, M. D., Clifton Forge, Va.

The use of radium in uterine hemorrhage is an established treatment. The division of opinion now lies in the proper selection of cases. While radium has robbed surgery of many possibilities, it has not yet removed the question of uterine hemorrhage from the domain of operative gynecology. When the proper care is exercised in the study of such patients, we will find many cases who will best be treated with radium. On the other hand, there will be observed a group which are best handled surgically.

From the experience gained in our own clinic, we are impressed with the necessity of a department of radium therapy, since we feel that radium is essential in the treatment of gynecological patients. In reviewing our case records since we have had radium, we cannot fail to wonder if we might have expected the same success from surgery as we have had in our group of patients treated with radium. A large percentage of the group of patients whom we have radiated, had they come to us a few years ago, would undoubtedly have been operated upon, and the operation which we might have performed would have been associated with an appreciable mortality.

The information available for general study in radium therapy is originating principally from the large institutions having a gram or more of radium element. Generally these institutions are collecting their own emanation and the element is infrequently used. Records of this kind are invaluable, and it is from the study of such records that we are able to arrive at conclusions as to the value of radium in certain diseases. We have found, however, that it is a difficult matter for those of us having fifty to one hundred milligrams of radium available to make applicable to ourselves the problems of the larger institutions. It is with the hope that the study of our own cases, who have been treated with a very modest amount of radium, may prove of value to men of like equipment that we are prompted to discuss these problems.

It seems to us that radium in a limited amount could be available to doctors or groups of doctors handling general surgical patronage. Patients are fast requiring such information that enables them to choose, in a manner, their own treatment. Radiation is not an unpleasant experience; it is rarely associated with postoperative discomfort, and it carries with it, relatively, no mortality. The average hospital days are markedly diminished as compared with the hospital days following a major surgical operation. Such inducements frequently prove factors in patients' choice of institutions.

The department of radium therapy can be established in any small institution without in any manner detracting from the other departments. It does not require a great deal of time and energy for some member of the staff to so familiarize himself with radium as to be able to administer it intelligently. I am glad further to say that such a department can be maintained and made to be self-supporting.

Our series has covered a study of sixty uterine cases treated with radium. We established our department of radium therapy two years ago. We have at our disposal sixty-six milligrams of radium. We have divided our patients into three groups of cases. First: The so-called myopathic, idiopathic, or essential forms of uterine hemorrhage patients. Of this type of patient we have treated thirteen. Second: Uterine fibromata or myomata. Of this type of patient we have treated forty. The tumors in this group have varied in size from those that were just palpable to others that were as large as a good-sized grape fruit. Third: Advanced inoperable cancers. Of this type of patient we have treated seven. In six of this group of patients the lesion has been found to have originated primarily in the cervix. In the seventh case there was a large carcinoma arising primarily from the fundus of the uterus.

There can be little doubt as to the advisability and efficacy of radium therapy in the treatment of the idiopathic types of hemorrhage occurring in women around the menopause. It is here that radium has proven nearly a specific. It is well within my memory that, when patients approaching the change of life came to a surgeon for treatment, the patient was advised to try symptomatic remedies. When such treatment failed to control the hemorrhage, this class of patient was generally

*Read at the fifty-fifth annual meeting of the Medical Society of Virginia, at Staunton, October 14-17, 1924.

advised to undergo an operation, usually for the removal of the uterus. Now, of course, when this type of patient is radiated with a sufficient amount of radium required to control the hemorrhage, there is produced a permanent menopause. In our small group of cases, we have not observed any unusually severe or foreign manifestations associated with this type of artificial menopause. Our opinion as to this observation is borne out by observers who have studied large groups of such patients. Twelve of our thirteen patients, who have been treated for idiopathic hemorrhage, have experienced immediate and permanent relief. The only patient who did not improve had, prior to her radium treatment, been subjected to several pelvic operations, the final one occurring about one year before we saw her, and culminating in the removal of both tubes and ovaries. The hemorrhage in this patient became so severe as to produce a profound secondary anemia, which necessitated transfusions and, finally, the removal of her uterus.

Radium in her case seemed absolutely worthless. Pathological studies of her uterus did not reveal anything except a general fibrosis with an extreme hyperplasia of her endometrium. Our average radiation in the iodiopathic case, approaching menopause, has been seven hundred and fifty milligram hours. It may be interesting to observe that the average hospital days of this group of patients has been only six. None of these patients has had complications other than a varying radium nausea, which has always been relieved when the radium has been withdrawn. In addition to eleven cases occurring in women approaching menopause, we have treated two young, unmarried women for extensive uterine hemorrhage, in whom we were unable to demonstrate any cause for their dyscrasia. Both of these patients were free of other pelvic disease or anomalies. Styptics, serums, and ductless gland extracts were used upon both of them without appreciable results. Finally, each of these young women was radiated with twenty-five milligrams of radium for six hours. One of them developed an amenorrhea which lasted for six months, and the other did not menstruate for three months. Both of these patients now, however, are menstruating normally without any evidence of menorrhagia. We realize that radium, in this class of patient, is not yet an established treatment.

In our group of fibromata or myomata cases we have treated forty patients. The average age has been forty-one years. The oldest was sixty-two and the youngest was twenty-six. We have radiated five women for uterine fibromata under thirty-five years of age. In each of these patients there has been some specific reason why radium was selected in preference to surgery, and, in each of them, we have directed our attention towards the control of the uterine hemorrhage and no effort has been made to obtain a shrinkage in the size of the tumors. We agree with the vast majority of observers that radium is not the treatment of choice in young women with fibroids of the uterus. The normal function of the pelvic organs can be conserved more adequately with surgery. It is interesting to observe that two of our five young women, who came to us suffering from uterine hemorrhage, caused by uterine fibroids, and who were radiated, have since become pregnant. One of these women was later delivered of a normal baby. The other patient was delivered at term, but her baby was dead. All this group of younger women were radiated with fifty milligrams of radium for six hours. The longest period of amenorrhea following their treatment was five months. In none of this group of patients was there produced any evidence of an artificial menopause. In our older patients with uterine fibroids no effort has been made to conserve the menstrual cycle. Our attention in this group of thirty-five patients has been directed towards control of the hemorrhage and shrinkage of the fibroid uterus. The radiation in the older patients has varied from eighteen hundred to three thousand milligram hours. Generally these patients have been radiated twice—two of our earlier patients had three radium applications. One of our fibroid cases developed a pelvic cellulitis on the third day after radiation and it later became necessary to drain for a cul-de-sac abscess. This patient probably had a latent infection in her pelvis, although her physical examination and history in no manner suggested such a disease. We feel that radium in her case, however, stirred up such an infection. Twenty-eight of the group of older women came to us primarily because of uterine hemorrhage. The remaining seven patients had palpable tumors, but were not suffering from hemorrhage. In the twenty-eight patients who had hemorrhages

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caused by fibroids, radium has acted as a real specific—each patient being completely relieved and no recurrences have been reported to us to date. Three of them, however, have been recent cases and it is hardly fair to class them as being completely controlled, inasmuch as sufficient time has not yet elapsed since their treatment. The amount of shrinkage of the fibroid growths is a very difficult matter to determine. We have recognized our enthusiasm in this matter and an effort has been made to be as accurate as possible. I think that a 65 per cent decrease in size would not be erroneous. The average hospital days in our fibroid cases has been eight.

During the time of the accumulation of this group of patients we have operated upon fourteen women for uterine fibroids. Some of them had pedunculated tumors; three had very large tumors, and others were operated upon because of evident pelvic infection associated with their uterine disturbances. Two of the operated patients, we feel, should have been radiated, but both patients had been advised of bad results following radium treatment, and they preferred surgery. Of the operated fibroid cases, nine patients had hysterectomies and five had myomectomies. The average hospital days of our group of operated patients has been sixteen.

Our third group of cases is made up of seven carcinoma patients. All of our cancer cases have been advanced, definitely inoperable lesions. They have been types of cases that a few years ago, had they approached us for treatment, we would have advised them there was no treatment, of which we knew, that would be beneficial to them. We would have further advised them to go to their homes and make the necessary preparations to die. Six of our cancer patients have had their initial lesion in the cervix. The remaining one was suffering from a large, infiltrating cancer of her fundus. None of our cancer patients has been treated over a sufficiently long period to establish any opinion as to the final termination of their disease. We have two patients, however, who received their radiation more than fifteen months ago. Both of them have been recently examined and there is absolutely no local evidence of cancer present at this time. Both of these patients had malignant infiltration into their bladder and rectum when they were treated. They have gained weight, and are enjoying normal health. Two of our carcinoma patients died soon after radiation and were afforded no appreciable improvement as a result of their treatment. One patient, who received four thousand milligram hours of radium, showed marked local improvement, but died four months later from what was supposed to be an extensive recurrence in her liver. The two remaining patients in this group of cases have received their treatment within the last five months and the bleeding in both cases has been completely controlled. One of them has been recently examined and appears markedly improved. The other patient has not been recently heard from. We realize that the results in our cancer patients have been in no manner inspiring, but certainly they have been afforded relief, which could not have been offered them before the advent of radium. The only very impressive thing that has occurred in all of our cancer patients has been the immediate control of their hemorrhage and the decided improvement in their offensive uterine discharge. The gross and microscopic appearances of the malignancy in our cancer patients have been decidedly similar and we are totally unable to explain why one case has gotten miraculous benefits and another has followed the usual course without appreciable change until death. The studies of our pathological reports have not afforded us any information as to why radium has benefited one patient and has proven absolutely inert in another.

We feel convinced, from the study of our own small group of patients, that radium has established itself as a valuable adjunct to surgery in the treatment of uterine hemorrhage in every group of case. We are aware, however, that radium, indiscriminately used, may readily injure its own reputation and establish for itself much distaste in the regular medical profession. We would urge that, before any patient is treated with radium, she be carefully and rigidly examined, and the choice of treatment in the individual case be considered. It would seem that the greatest doubt in the minds of the profession today, concerning radium in the treatment of uterine hemorrhage, is the question of its advisability in the treatment of young women. There are a number of authorities who feel that radium, advisedly used, may accomplish much in this group of patients without destroying permanently ovarian function. It is belived by Clark and

others that more radium is required for the permanent destruction of ovarian function in young women than upon the ovaries of older individuals. Dr. Clark believes that twenty-five milligrams of radium may be used from four to six hours in young women with absolute safety. In regard to the manner in which radium produces its effect, he believes that the rays exert an influence upon the endometrium, as well as upon the ovaries. It has been demonstrated that radium, in sufficiently large doses, will destroy the Graafian follicles. This has been shown by an examination of ovaries which were removed following radium treatment. The extent of the destruction of the follicles depends upon the size and time of dosage, and also upon the age of the patient. Frequently, the temporary amenorrhea is caused by the destruction of the ripe Graafian follicles, which are situated near the surface of the ovary. As the primordial follicles develop from the center of the ovaries and migrate to the surface to form Graafian follicles, menstruation is re-established. Radium therapy has not reached the stage of development, and the uniformity of dosage is not sufficiently worked out, for us yet to accept it as a universal treatment in the menorrhagias of young women. However, when it is remembered how little we are able to accomplish by ductless gland therapy, animal serums, various styptics, and curettage, we must recognize that there is a field for the correction of this disease in young patients, when we are unable to establish a cause for the menorrhagia.

Werner believes that pregnancy can occur after X-ray and radium treatment of the dosages in vogue, even when the stage of amenorrhea has been acquired, and he states that no special danger need be anticipated in the course of the pregnancy, nor in labor, in these patients. He has found, however, that there is a definite tendency in radiated patients to abort. The group of babies which he has studied have appeared normal at birth, but their development, he thinks, has been somewhat retarded.

Dr. John Osborn Polak has tabulated some interesting reasons for and arguments against the use of radium in the treatment of uterine myomata. First: In radium there is no operative mortality, inasmuch as these patients can usually be treated without an anæsthetic. Second: Should radium fail, operation is always possible. Third: He believes that, in the production of an artificial menopause, the menopausal symptoms are not so severe. Fourth: The intramural tumors show absolute cessation in hemorrhage and the shrinkage is very appreciable. Fifth: Radium is valuable in the treatment of these patients, who have complicated constitutional disease, such as heart disease, extreme anemia, diabetes, and nephritis, and who would be poor operative risks. His objections are: First: In a moderate percentage of fibroid cases, there is a complicated malignancy present and, although careful curettage is done before operation, it is very possible not to remove a part of the malignant degenerative process. Second: More than fifty per cent of his operations in fibroid cases have been associated with intrapelvic lesions of the tubo-ovarian type. Third: Radiation, when given in sufficient dosage to check hemorrhage and to shrink the tumors, will impair the reproductive functions in young women. Fourth: It is a recognized fact that the shrinkage in a fibroid from radium is very slow and frequently in these patients there is an immediate demand for relief of the pressure symptoms. Fifth: The immediate effects of radium is the production of edema and excitation of a general inflammatory reaction. Sixth: Radiation will increase the necrosis in tumors which are already necrotic and, by added acidosis, increase the toxemia of the patient. Whereas, these approvals and objections are well grounded, we must still recognize that radium, in selected cases is invaluable in the treatment of patients suffering from uterine myomata occurring in women around the menopause. Of course, diligent care must be exercised in an effort to determine whether these patients have associated pedunculated fibroids or intrapelvic inflammation.

Radium in the treatment of uterine cancer has been largely used in the inoperable cases. Little has been expected from its application and no great disappointment has been felt when results have not been obtained. Prior to the advent of radium, little or nothing has been offered the inoperable uterine cancer patient. Radium, however, will control the hemorrhage, abate the symptoms, and often prolong life. Each year there are being reported a number of advanced cancer patients who have been treated with radium and who have gotten marvelous benefits. Some of them are well now, after a period of five or six years.

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Comparison of the results of surgery and radium in the treatment of cancer of the uterus is interestingly observed by Dr. Rex Duncan. He tabulated the results of six thousand cases reported by surgeons of this country and Europe. His studies show that, in one hundred patients presenting themselves for surgical treatment today, sixty must be turned away without treatment. Of the forty who are operated upon, 18 per cent or seven die as a result of the operation. Eight patients will be cured and the remaining twenty-five will have recurrences. The sixty who are turned away, the seven who die from operation, and the twenty-five who have recurrences, leave only eight who are cured. Ninety-two out of each one hundred patients are doomed, unless some method, other than surgery, comes to their relief. He has gathered three hundred cancer patients, who were treated with radium more than two years ago. There are one hundred and twenty-two who are living, or 40 per cent who are clinically well over periods varying from one to seven years. Of these, ninety-nine, or 36 per cent have remained clinically well. I recognize that we are hardly ready to accept, as authentic, the fact that radium offers greater advantages to our cancer patients than surgery. However, when any group of records is reviewed, we can readily see how totally inadequate surgery is to meet the general demands for the permanent cure of cancer of the uterus.

BIBLIOGRAPHY.

John Clark: "Treatment of Inoperable Cervical Cancer," *Amer. Jour. of Med. Sciences*, April, 1922.

Werner: "Influence of Deep Radium and X-Ray Treatment on the Process of Reproduction," *Amer. Jour. of Obs. and Gyn.*, September, 1922.

John Osborn Polak: "Notes on the Clinical Value of Radium in the Management of Uterine Hemorrhage," *Medical Record*, March 25, 1922, Vol. 101, No. 12.

Rex Duncan: "Treatment of Uterine Cancer," Abstracted in the *Journal of Radiology*, February, 1923.

X-RAY EXAMINATION OF THE URINARY TRACT.*

By JOSEPH T. McKINNEY, M. D., Roanoke, Va.

During the past two decades probably more progress and development has been made in the study and diagnosis of diseases of the urinary tract than in any other branch of medicine. The combined work and efforts of the urologist and radiologist have been the means of bringing about an accuracy and refinement in diagnosis hitherto impossible, resulting thereby in greatly improved methods of treatment. No two specialties in medicine require a closer correlation of work, and here a word in regard to the co-operation of the general practitioner would not be amiss. It is he upon whom rests the responsibility of first sifting out the evidence and deciding whether a certain line of symptoms demand urological investigation. The surgeon and internist are also daily confronted with the same problem.

The roentgenologist is often asked what information can be obtained by an X-ray exami-

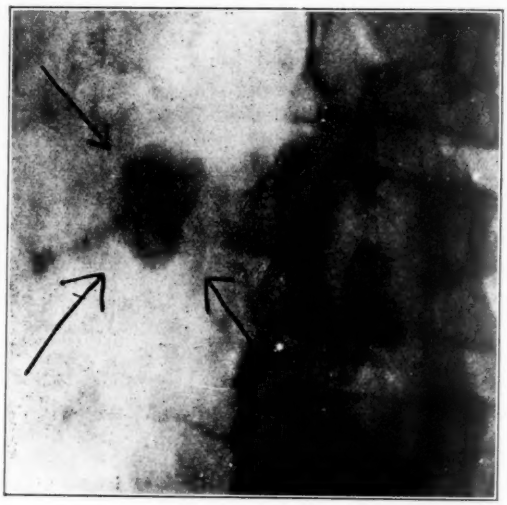

Fig. 1.—Case 1. Large renal calculus removed from pelvis of right kidney by Dr. Gale, Aug. 30, 1924, all symptoms at first simulating acute appendicitis.

nation of the urinary tract. In the early years of the work, the radiologist could only determine the possible presence or abscence of calculus, and the approximate size and position of the kidney. But with the advent of pyelography, first used by Von Lichtenberg in 1906, and later developed to its present high degree of efficiency in this country by Braasch and others, a large and increasing number of pathological conditions are able to be determined.

Time will permit of only a brief survey of this work. First, in all cases of suspected urological conditions, a preliminary examination of both kidneys, ureter and bladder should be made. The patient should be given a mild cathartic the night before, an enema in the morning, and allowed no breakfast.

*Read at the meeting of the Southwestern Virginia Medical Society, at Marion, September 12, 1924.

After the preliminary ray the patient should be sent to the urologist for cystoscopy, followed by catheterization of the ureters, and further studies as the individual case demands. In the event any suspicious shadows are seen, opaque catheters should be passed in the ureters, then X-ray examination again made, followed by a pyelogram or ureterogram as indicated. As is well known a negative report does not in itself rule out a calculus. The uric acid calculus does not cast shadows upon the X-ray film. Fortunately, though, they are seen much less frequently than the phosphatic or calcium types. They are usually small, not well organized, and are often passed. To mention only a few of the many things that may simulate renal and ureteral calulus will give you some idea of the difficulties encountered: foreign bodies in the intestinal tract, convolutions of the intestines, calcified glands, fecoliths, phleboliths, gall-stones, and calcifications in the muscles, pigmented moles, and the presence of shadows afterwards found associated with double ureter or double pelvis of the kidney.

Fig. 2.—Pyelogram, Case 1, showing renal calculus completely surrounded by injecting solution, with slight stricture of ureter below uretero-pelvic junction.

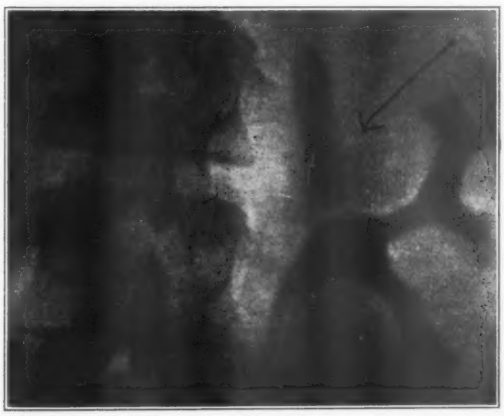

Fig. 3.—Case 2. Pyelogram showing extra-renal shadow, probably tuberculous calcification in the soft tissues.

I should like to mention a condition first called to my attention by Dr. Cary, that of well organized blood clots, cells and detritus encountered in the ureter, and giving all the cardinal symptoms of a calculus. Here a catheterization of the ureter and irrigation of the pelvis gives marked relief.

The tube shift method, by making a double exposure on one plate, is frequently a great help after catheters are inserted in diagnosing the presence or absence of calculus. The use of the Bucky Diaphragm and double screens have made the technical work of the radiologist much more efficient. Many solutions have been used for pyelography, but for the past year we have been using a 12 per cent aqueous solution of sodium iodide, which has proved to be by far the least toxic and freer from reactions of any solution yet found. The gravity method of injection is the method of choice, and never under any circumstances should both kidneys be injected at the same time. Mild pain during the injection should be the signal for discontinuing the injection.

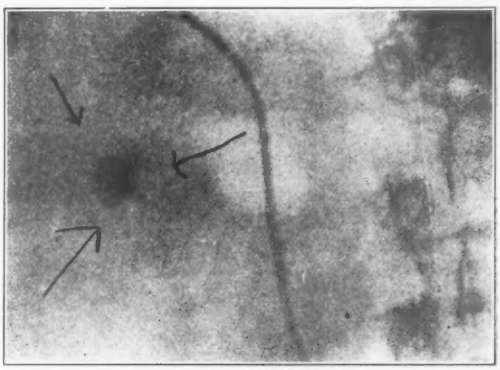

Fig. 4.—Case 3. Referred by Drs. J. W. Preston and W. W. Butler. Calculus right kidney.

From a pyelogram or cystogram we can determine with fair accuracy the following conditions: a normal pelvis, hydronephrosis, strictures of the ureter, tumors of the kidney and bladder, mono- and polycystic kidneys, pyonephrosis, and malformations of the kidney. The pyelogram probably offers the only method

whereby early hydronephrosis can be diagnosed, which condition may be caused by tumors, mechanical obstruction and infection. The injected kidney shows a wide variety of shapes, but mainly a broadening, and at times obliteration of the calyces, increase in size of the pelves, change in the angle of the ureter,

Fig. 5.—Case 3. Pyelogram showing double pelvis of right kidney, the calculus noted in Fig. 4 being surrounded by iodide solution, and located in the inferior or lower pelvis.

with a definite blunting and flattening out of the terminal projections of the minor calyces, all or parts of which may be seen in hydronephrosis, tumors and similar conditions.

In passing it is well to mention that only a few cases of floating kidneys are accompanied by hydronephrosis, and that you may have a marked hydronephrosis without symptoms.

Fig. 6.—Case 4. Ureteral Calculus.

The movable kidney, even if the ureter showed angulation, should not be operated upon unless a definite mechanical dilatation of the pelvis and ureter was found.

I wish especially to call attention to the broad class of patients suffering from chronic gastro-intestitnal disturbances, indigestion, nausea, vomiting, flatulence, diarrhoea, associated with pain on the right and left sides of the abdomen, and in the lumbar regions, who have been treated for the above various symptoms, without obtaining relief, and want to urge that before operative procedures are advised, a complete study of the urinary tract be made.

To quote from a recent paper by Dr. C. H. Mayo, read at the meeting of the A. M. A. in June, 1924: "The appendix may be involved in pelvic inflammation and its resistance lowered. The former is also true of its relation to the right ureter; an inflamed appendix adherent to the peritoneum over the right ureter at the brim of the pelvis may lead to a pathological condition with blood in the urine, and to an erroneous diagnosis of renal disease. Acute or chronic abdominal lesions are often attributed to the appendix. Thus in one-third

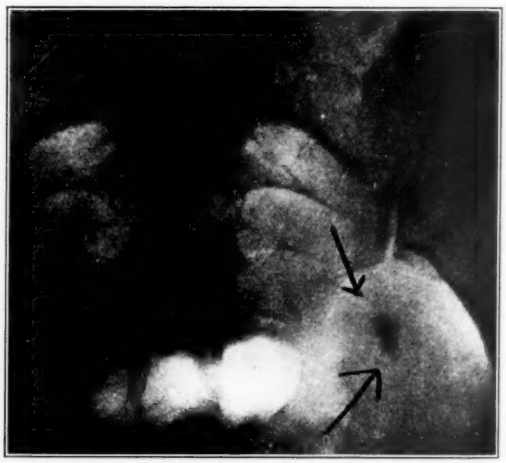

Fig. 7.—Case 4.—Showing descent and movability of ureteral calculus noted in Fig. 6. Calculus passed four days after first examination.

of the cases of stones in the left ureter, associated with colics, the appendix is removed without relief, and in approximately two-thirds of the cases in which there is a similar condition on the right side, the appendix is removed ineffectually."

Case one, I should like especially for you

to note. Mrs. S., admitted to the Lewis-Gale Hospital, August the 17th, 1924, with all the clinical symptoms of an acute appendix. Examination of the urine in the early morning by the referring physician was negative. However, another examination of urine at the hospital six hours later showed pus and a few blood cells. Dr. Gale postponed operation, ordered an X-ray examination next morning, and a large shadow was found in the right kidney region. A catheter was passed, which passed to the inner side of the shadow. A pyelogram done at this time showed a small amount of

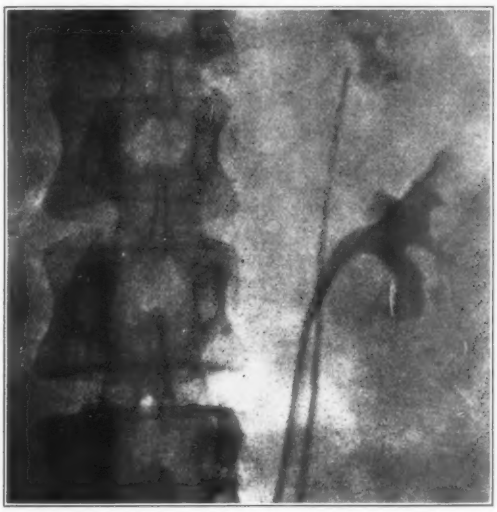

Fig. 8.—Case 5. Pyelogram showing double pelvis left kidney and double ureters.

iodide solution encircling the shadow, which appeared to be in the pelvis, though we afterwards found out the pelvis of the kidney contained so much organized detritus and blood clots, we did not obtain an entirely satisfactory pyelogram. Several days later another pyelogram was made, and this time the entire shadow was surrounded by the solution, and the whole pelvis and calyces well filled, showing a small hydronephrosis. There are several very valuable lessons to be learned from this case. First, the fact that all symptoms appeared to simulate an acute appendix, and second the wisdom of more carefully weighing all evidence before performing an operation. The observation that no pus was found in the first urinalysis is explained by the blocking off of the ureter by the stone, followed by the acute attack. Dr. Gale later removed a large

Fig. 9.—Case 6. Referred by Drs. Whitman and Cary. Pyelogram showing moderate hydronephrosis and hydroureter.

renal calculus from the pelvis of the right kidney, a drain was inserted, and while there was some leakage and accumulation of a small pocket of urine several days later, this patient is making satisfactory progress at the present time.

Among some of the other conditions illustrated by the slides are diverticulum of the bladder, hydronephrosis, hydroureter, cystogram showing distortion of the bladder by retro-peritoneal sarcoma, vesical calculus, slides demonstrating the movability of ureteral calculus, renal calculus, double pelvis of the kidney and double ureters, and a case of bilateral kidney tumors of enormous size.

Case three in the series is unusual in that a shadow was seen on the preliminary examination, a catheter was inserted, and this shadow was seen to be apparently somewhat distantly removed from the pelvis of the kidney. The kidney was injected, the pyelogram showing a double pelvis with the stone in the lower pelvis. This patient had only recently been examined in one of the clinics of our larger cities for somewhat indefinite gastro-intestinal symptoms, was put on a diet, and sent home. The underlying cause of his illness was overlooked

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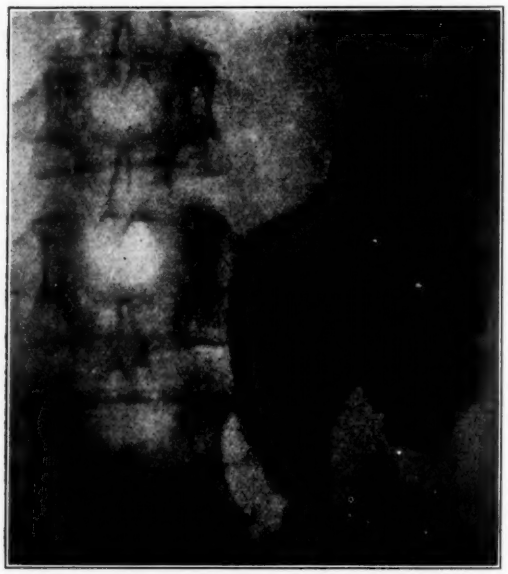

Fig. 10.—Case 7. Referred by Dr. S. S. Gale. Pyelogram showing hydronephrosis with constriction of the ureter below uretero-pelvic junction.

by a failure to study the urinary tract. The same is true of the diverticulum of the bladder shown, this case having been treated for years for cystitis of unknown origin.

Fig. 11.—Case 8. Referred by Drs. Cary and Farmer. Pyelogram of large floating kidney showing enormous hydronephrosis, 120 c.c. of sodium iodide solution being injected. Note absence of hydroureter.

Conclusions. In this brief summary I have taken up some of the commoner pathological lesions of the urinary tract, illustrating the methods of roentgen ray study and diagnosis, and want to urge the necessity of a more careful and definite working out of your cases, and the great importance of continually bearing in mind the diseases of the urinary tract.

620 *Anchor Building.*

THERAPEUSIS BY INTRAPERITONEAL INJECTIONS IN INFANCY.*

By THOMAS E. OAST, M. D., Portsmouth, Va.

Therapeusis by the intraperitoneal route is not new. Sansby[1] and Siperstein found that as far back as 1875, Ponfick and Leigl, of Germany, and also Giovanni, of Italy, tried using this route for the injection of defibrinated blood. However, their results were so variable that the procedure was dropped, and it was not until 1918, when a report by Blackfan and Maxey[2] showed the safety of this method for giving saline solution, that it began to rise in popularity. Since that time numerous articles have appeared dealing with the separate phases of the subject, especially concerning its use in the administration of saline. It is the purpose of this paper to correlate this information and discuss briefly to what extent this route may be used as a therapeutic avenue.

Substances Available for Injection.

At the present time we are limited in this procedure to:

(1) Solutions such as normal saline, bi-carbonate of soda, glucose and Ringer's solution.

(2) Antitoxin in diphtheria.

(3) Blood.

Blackfan[2] and Maxey were the first to report using normal saline intraperitoneally. Many [3, 4, 5, 6, 7, 8], have since reported gratifying results in thtir experiences with these injections. Others have used from 5 per cent to 10 per cent glucose solution, 2 per cent bicarbonate solution and Ringer's solution, but their results have been erratic and it is now conceded that other than saline, these solutions had best be given orally, or in emergency, intravenously.

Marriott[9] in championing the glucose injections is a bit doubtful as shown in his statement that "Glucose has been given intraperitoneally with excellent results, but in a certain

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number of cases leads to marked distention." Mitchell[8] also reminds us of the distention following solutions other than saline and goes so far as to warn against their use, intraperitoneally.

Platou,[10] of New York, was the first to use antitoxin by this method, reporting a series of patients with diphtheria in which he obtained excellent results. In this series, he confines himself to the use of diluted antitoxin, using 8 to 10 c.c. of saline solution as a diluent. Last year I gave antitoxin intraperitoneally in four cases of diphtheria and found it very effective; in two of these, using the diluted antitoxin, and in the remaining two, using it concentrated from the original syringe, and noting no difference in the effect produced.

Blood was the first substance ever injected intraperitoneally, dating back to 1875. As mentioned before, this was defibrinated blood and gave varying results. In recent years our attention has been attracted to this means for transfusion by Sansby[11] and Siperstein. They have shown: (1) that red blood corpuscles are absorbed from the peritoneal cavity; (2) that they re-enter the blood stream as red blood corpuscles; (3) that they are capable of functioning after re-entering the general circulation, proving conclusively that citrated blood can be injected intra-abdominally and with good therapeutic effect. Since some observers have noted in transfusions by the older routes that there is less reaction using whole blood than with citrated blood, the natural query is, why not use the whole blood intraperitoneally? It can be used, but there are varying reports as to its therapeutic efficacy.

Ruh[12] and McClellan (Ohio) report encouraging results in its use, while Sansby and Siperstein, whose work has been very exhaustive, failed to demonstrate the absorption of whole blood. In every case (referring to experiments on rabbits) they found clots in the peritoneal cavity at necropsy, and subsequently masses of adhesions. With citrated blood they failed to encounter either of these in a single instance.

THE NEED FOR AN INTRA-ABDOMINAL ROUTE.

One merely has to recall in his own experiences the difficulties encountered in previously existing methods to realize there is a vast field of usefulness for a method embodying simplicity, rapidity, effectiveness, and a minimum of annoyance to the patient. The advantages offered in the injection of saline solution are numerous. It is practically painless, the only sensitive step being the piercing of the abdominal wall. There is no discomfort during the flow of the fluid as that experienced in hypodermoclysis. The fluid is always retained, which cannot be said of that given orally or by bowel. It is much more simple though not as rapid as by the intravenous route. All of you know the difficulty in the utilization of the vein for injection in infancy. The rapid absorption can be judged from Mitchell's statement in quoting Blackfan and Maxey, that 40 to 60 per cent of injected fluid is absorbed within one hour. He also relates a case in which only 50 c.c. of saline solution was found in the peritoneal cavity at necropsy performed 6 hours after 200 c.c. had been injected. Then, too, there is the advantage that this route can be used over and over again; it lends itself to almost unlimited repetition. Large amounts—from 100 to 300 c.c.—varying with the weight of the infant, can be injected as often as every eight hours (Mitchell).[8]

Gittings and Donnelly[7] advocate using 20 to 30 c.c. for each pound of body weight, though they, too, limit the volume to 300 c.c. for one injection.

Relative to its use in the administration of antitoxin, the most important advantage lies in its rapidity. Platou[10] has shown that within an hour after intraperitoneal injection the blood is appreciably antitoxic, and up to seven hours the absorption is about five times that of the intramuscular injections, stating also that within an hour the antitoxin absorbed is more than sufficient to neutralize the circulating toxin in any case of diphtheria. Absorption is not as rapid as in the intravenous route, but this method is not intended to supplant that route except in selected cases. We do not have the intense suffering and localized tenderness seen after the intramuscular and subcutaneous injections. It is its simplicity, relative rapidity and lack of pain that makes the intraperitoneal route so attractive, especially in those infants whose veins are not suitable for injection.

It was after the intramuscular and subcutaneous methods in conditions demanding a transfusion were found lacking that the intra-abdominal route was sought for that purpose. Taylor[13] found that subcutaneous and in-

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tramuscular injection of blood is usually followed by a rise in hemoglobin, but only a small fraction of cells so injected reach the circulation. He found the average non-agglutination count was 50,000, and after injection 97,350 whereas it should have been nearer 200,000. Transfusion, intravenously, is ideal under proper conditions, especially when a vein of sufficient caliber is at hand. Even then, it requires one more or less experienced in blood vessel surgery, and is a much more intricate procedure than the intraperitoneal.

The anterior fontanelle route was popularized by Helmholtz[14] in 1915, but this, too, has its limitations in that it is rarely available in infants over 18 months of age.

The Indications for Therapeusis, Intraperitoneally.

These would depend entirely on the substance to be injected. The indication for normal saline would include any condition requiring fluid, or accompanied by dehydration. These injections have found their greatest field of value in those gastro-intestinal diseases where the loss of fluid is great, due to vomiting and diarrhea.

The intraperitoneal route in the administration of antitoxin would be indicated in those cases of diphtheria requiring a more rapid effect than obtained by the intramuscular injection, and where it would be impractical to inject directly into the vein.

The indication in blood transfusion, for the intraperitoneal method, would be in those patients requiring a true transfusion in whom the intravenous route was not available, due either to small caliber of veins, or to the closure of the fontanelle.

Complications of Intraperitoneal Injections.

That this procedure is practically devoid of danger is attested by the rapid popularity it is attaining as a route for therapeusis. It is almost impossible for the needle to enter the gut, if properly inserted. Mitchell proves this point by noting the difficulty experienced in attempting to puncture the gut at autopsy with the size needle used in these injections. It is, however, necessary to make sure that the bladder is empty and that no distention is present. Peritonitis and shock have been reported following intraperitoneal injections (Backes[15]) but only in a comparatively few instances.

These complications must be exceedingly rare, for at the Children's Hospital in Philadelphia we gave these injections routinely in dehydrated infants, and not in a single case did we encounter these conditions. There is some danger of peritonitis when injecting infants who are afflicted with furunculosis, yet with a little added care and a scrupulous technic this should not be an absolute contra-indication. Mitchell[8] mentions the undesirability of using this route following recent abdominal operations, such for instance, as pyloric stenosis. It is evident that in these cases we might expect to get sloughing of the stitch wound by the distention and do more harm than the injection would do good.

In administering antitoxin intra-abdominally we experience the same phenomena attending such injections by any of the other routes, except that the chance for reaction is by no means as great as in the intravenous. We would do well to follow the usual precautions of injecting a small amount and waiting to see if there is anaphylaxis. The late manifestations, such as urticaria, occur in about the same proportion of cases as by the other routes.

The attending danger in intraperitoneal transfusion is that of any transfusion, and one that can be greatly minimized by previously typing the blood of donor and recipient. Sansby and Siperstein[1] in their series of cases, reported no alarming symptoms following this method.

Technic of Intraperitoneal Injection.

There are two methods of giving these injections, known as the syringe method and the gravity method. Both are safe—the use of one or the other depending on the rapidity desired in the flow of fluid into the abdominal cavity. Porter and Carter[16] give a clear description of these methods, from which I will quote freely.

Make sure there is no distention and that the bladder is empty. Then enfold the infant's pelvis and legs in a large towel which shall be snugly pinned. Restrain the arms across the chest in the same manner and lay the infant on his back. The operator should employ the strictest surgical asepsis, including scrubbing up and wearing rubber gloves. The abdomen is then cleansed with green soap, followed by 2 per cent iodine and 50 per cent alcohol, and draped with sterile towels. Next pick up a fold of skin and integument of the abdomen about 1/3 the distance from the

umbilicus and the symphysis, with the thumb and finger of left hand, inserting the needle in an upward direction, and in the mid-line, through the abdominal wall, (needle of 18 gauge, beveled at 45 degrees). The fluid is then injected slowly. No harm is done by dropping the base of the needle on the abdomen each time disconnection is made in order that the syringe may be refilled.

If one desires to use the gravity method, the container with the fluid is suspended two feet above the level of the site of injection. The fluid is started flowing through the tube and if at body temperature, the needle is inserted.

The technic described applies particularly for the injection of saline solution, though it can be used equally as well for the antitoxin or for the blood.

It is important to remember that any fluid injected into the peritoneal cavity should be at body temperature, and that a sterile dressing should be applied following the injection. In using diphtheria antitoxin, one can use it concentrated, or diluted by adding 8 to 10 c.c. of normal saline solution.

In intraperitoneal transfusion, Sansby and Siperstein[1] advocate using 10 c.c. of freshly prepared 2 per cent sodium citrate to every 100 c.c. of donor's blood, which should be kept at body temperature. Then strain through sterile gauze and inject immediately.

SUMMARY.

A review of the literature reveals the fact that the intraperitoneal route offers a simple, safe, effective, and comparatively rapid avenue for administering therapeutic agents; that to date the substances available for injection are limited to:

1. Solutions, as saline, glucose, Ringer's, bicarbonate of soda.

The best results are reported from the use of normal saline solution.

II. Antitoxin in diphtheria, which can be used either concentrated or diluted. While there is no mention of tetanus antitoxin having been injected intraperitoneally, there seems to be no contraindication for its use, or for that matter of any non-irritating substance.

III. Blood.

Both whole blood and citrated blood have been used, but clinical reports favor using the citrated blood for injection into the abdominal cavity.

BIBLIOGRAPHY.

1. Sansby and Siperstein, Jour. A. M. A., June 1 1923, p. 1763.
2. Blackfan and Maxey, Amer. Jour. Dis. Children, Vol. 15, 1918, p. 19.
3. McLean and Lang, Amer. Jour. Dis. Chil., 1920, Vol. 24, p. 357.
4. Aikman, J., Jour. A. M. A., 1920, Vol. 74, p. 244.
5. Denzer and Anderson, Amer. Jour. Dis. Chil. 1921, Vol. 21, p. 565.
6. Donelly, J. D., N. Y. Med. Jour., 1921, Vol. 114, p. 151.
7. Gittings and Donnelly, Am. Jour. Dis. Chil., Feb., 1922, p. 124.
8. Mitchell, A. Graeme, Arch. Ped., May, 1922, Vol. 39, p. 291.
9. Marriott, Amer. Jour. Dis. Child., 1920, Vol. 20, p. 461.
10. Platon, Arch. Ped., Sept., 1923, Vol. 40, p. 575.
11. Sansby and Siperstein, Amer. Jour. Dis. Chil., Vol. 25, p. 1071.
12. Ruh and McClellan, Ohio State Med. Jour., (Columbus) Nov., '22, p. 769.
13. Rood Taylor, Amer. Jour. Dis. Child., Oct., 1920, Vol. 20, p. 340.
14. Helmholtz, Amer. Jour. Dis. Chil., Sept., 1915, Vol. 10. p. 174, quoted by Sansby and Siperstein (1).
15. Backes, quoted by Mitchell (8).
16. Porter and Carter, Management of Sick Infants, C. V. Mosby, 1st edition, 1920, p. 502.

716 *Court Street.*

ANEURISM.*

By ISRAEL BROWN, M. D., Norfolk, Va.

This paper is not so much a study of aneurism as a reference to the surgical treatment.

The operation for aneurism is one old in history. Antyllus described his operation of ligation of the artery immediately above and below the aneurism, with incision into the sac and turning out the clots. This was in the third century A. D.

Our observation for operative types, not considering the inaccessible, are arterial arteriovenous, and ruptured aneurism. The greatest causative factors are syphilis and traumatism. Osler says Venus, Bacchus, and Hercules are to be recognized as the etiologic trinity in the causation of aneurism. At least seventy per cent of aortic aneurisms are syphilitic; some authors place this as high as ninety per cent. Alcohol, not so great now, as well as posture and active life, are two causative factors. Syphilis acts by attacking the adventitia and media of the artery, causing gummata and necrosis, in this manner causing a gradual dilatation.

The regular tendency[1] of an aneurism is to enlarge without cessation until it ruptures.

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Hence, the necessity of treating them from the moment they are recognized (Delbert).

Medical treatment of non-operative type, especially of the aorta. should be directed more to the anti-syphilitic factor—giving more mercury and arsphenamine, and not depending on the iodide of potash. This, with three months' rest in bed, and diet, has given good results to MacLachlan.[2]

It is well to digress here before going into the operative treatment to speak of a peculiar symptom in arteriovenous aneurism or fistula, as described by Matas.[3] He calls atttention to enlargement of the heart, and cardiac distress on pressure over the arteriovenous fistula (aneurism) of long standing. The Branham bradycardiac phenomenon, pressure over the long established fistula, would cause dropping of the pulse from 80 to 60 beats. This would persist if the pressure was kept up, and if continued the patient would feel faint and dizzy.

Hoover and Beams[4] were the first to describe and study the effect on the heart and circulation of a large arteriovenous aneurism. The symptoms resemble very much myocardial degeneration of an advanced stage with an hepatic pulse. One case described was so marked with ascites and edema that the symptoms were thought entirely due to heart disease, but showed a complete recovery after an operation upon the aneurism. These authors also described in detail the differential diagnosis and animal experimentation.

Chronologically the ligature operation is as follows:

Proximal side immediately above sac, Anel's operation, 1710.

Distance from the sac, Hunter's operation, 1785.

Distal side close to the tumor, Brasdor's operation, 1798.

Scarpa's operation, same as Hunter's except higher up in Scarpa's triangle, 1819.

One or two of its main branches, Wardrop's operation, 1825.

Immediately above and below the aneurism without opening the sac, Pasquin's operation. If the sac is opened, it is the operation of Antyllus.

Partial occlusion, Porta, 1800-1875.

Gradual occlusion, Halsted's metal bands.

The radical operation, aneurismotomy (Antyllus).

Aneurysmectomy (Philagrus and Purman) 1680.

Endo-aneurysmorrhaphy (Matas), 1888.

Evidently on account of gangrene and hemorrhage the operative study of aneurism in the pre-Lister, and before the anæsthetic era, was of profound interest. The amount of suppuration and secondary hemorrhage led John Hunter to devise his operation for ligating in Hunter's canal for popliteal aneurism.

While the Matas operation, or intrasacular method, should be the choice of operation, all the other and older methods have their applicability, and at times will have to be the operation of choice. The great danger of operation is gangrene. The intrasacular method interferes the least with collateral circulation. The object of this operation is either to obliterate, reconstruct, or restore the main arterial openings, closing all other openings in the sac—procuring perfect hemostasis. Matas has, with other operators devised certain means of testing the circulation by pressure on the main vessels, and watching the return of the circulation. In his later paper, he believes that the obliterative type has the most applicability; this has been our observation.

Despite bandaging, tourniquets, and catching the main vessels above and below the aneurism, the operation is a very bloody one. In ruptured aneurism the operation of choice should be the Matas operation, as blood flowing for some time will give the sac an endothelial lining the same as blood vessels, and the same adhesive power as peritoneum.

In our experience ruptured aneurism is a very serious accident. In our series of five cases were: one of the popliteal, with gangrene, amputation; recovery; femoral, of old standing, amputation at hip joint, recovery; femoral, of old standing, the classical operation (Matas), recovery; carotid, no operation, far advanced tumor, and death. This was not diagnosed until autopsy. Traumatic of femoral while waiting six weeks for a better formation of sac, ruptured with terrific hemorrhage in tissues; there was threatened gangrene, added hemorrhage of operation, and death.

Delbert says there is probably no other disease which exhibits such a long list of celebrated diagnostic errors.

An old ruptured aneurism is a condition that at times is very difficult to diagnose. I

cannot find this condition described in literature.

A patient presents himself with a circumscribed or diffused tumor of the extremity. It is a firm, semi-solid tumor, without any pulsation, bruit or thrills. The history is a tumor of recent growth, probably a month, and unless you get a history of previous pulsating tumor it is very difficult to diagnose. The patient is emaciated, confined to bed, has a very painful limb, and you will find marks where it has been aspirated or even punctured in one of its softer, apparently fluctuating points. Aspiration usually results in three or four drops of blood only. The tumor and general condition resemble a rapidly growing malignant growth. The patient is usually about the fourth decade, and the Wassermann is positive. The gross pathology is an endothelial lined cavity filled with old clot surrounding a center of softer fresh clot, with a stream of blood flowing out of the artery at the center or bottom of the growth with its capacity flow, like a small stream flowing under a bank of snow. This growth has followed the muscle planes and fascia, travels a considerable distance, and is under a great deal of tension.

Here, too, it is possible to perform the ideal aneurism operation of Matas. In arteriovenous aneurism the approach is either through the sac or through the vein, sacrificing the vein, if necessary, and suturing the opening in the artery.

BIBLIOGRAPHY.

1. Keen's Surgery, Vol. 5.
2. MacLachlan, *Amer. Jour. Med. Sciences*, Vol. 159: 525.
3. Matas, Surg. Clinics of N. America, Oct., 1922, 1165.
4. Hoover and Beams, *Arch. Int. Medicine*, Jan., 1924, pages 1-22.

THE OUTLET AND ITS PELVIMETRY.*

By MILLARD B. SAVAGE, M. D., Norfolk, Virginia.

The outlet, as used as an obstetrical term, refers to the lower portion of the birth canal in and around that portion of the pelvis which is spoken of as the inferior strait. Anatomically it consists of bony and soft parts. Mathematically it represents two triangles with a line drawn between the ischial tuberosities as the common base.

The outlet is bounded anteriorly by the lower margin of the symphysis, laterally from before backwards by the pubic arch, the ischial tuberosities, the sacrospinous and the sacrotuberous ligaments. Posteriorly it is bounded by the tip of the coccyx.

From an obstetrical viewpoint the levator ani muscle is the most important structure of the soft parts and for practical purposes may be considered the pelvic floor, serving as a diaphragm to the inferior strait. During pregnancy[1] the levator ani muscle undergoes hypertrophy in order that it may function in its purpose to a better advantage. It supports the structures above it and in its support of the vagina and the rectum, its action is to draw them upward and forward towards the symphysis. During the second stage of labor it offers resistance to the fetal head until the time is reached when it can contract against the head in such a manner as to elevate the pelvic floor and, in so doing, it facilitates the expulsion of the fetal head. This action may often be used to an advantage in accomplishing the birth of the head between labor pains. After control of the head is obtained as it comes over the perineum, a gentle pressure from below upon the sinciput will assist proper extension and the occiput will rotate beneath the pubic arch slowly.

The diameters of the outlet which are of most importance represent the various distances between the bony parts of the anatomical pelvis, and the measuring of these distances constitutes outlet pelvimetry.

The transverse diameter, also called bituberal or interischial, is the greatest distance between the ischial tuberosities, and is measured at the level of the anus.

The anterior posterior diameter represents the distance from a point at the lower border of the symphysis to the sacrococcygeal articulation.

The posterior sagittal diameter is the distance between a point midway of the transverse diameter and the tip of the sacrum.

The development of outlet pelvimetry and the significance of its importance has grown gradually along with the advance of obstetrics and general pelvimetry. It may be said to have as its primary purpose the diagnosis of outlet contraction. The existence of the contracted outlet, or funnel pelvis, has been mentioned in many historical writings upon obstetrics. Williams[2] in a article upon this subject states that Deventer, de la Motte, Smellie and others reported isolated cases of outlet con-

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traction. During the eighteenth century Baudelocque gave an accurate description of the funnel pelvis. He is also credited with having invented the first pelvimeter, which consisted of a pair of calipers with a scale upon them to indicate the extent which they were opened.

Bush and Killian in 1839, stated that dystocia frequently occurred with a funnel pelvis. Breisky in 1870 described an instrument for measuring the distance between the ischial tuberosities and between the lower margin of the symphysis and the tip of the sacrum. Frankenhauser in 1879 estimated that one in each hundred pelves had contracted outlets. Klien in 1896 reported 24 per cent of his cases as contracted outlets and he devised an instrument for measuring what he designated as the posterior sagittal diameter. Williams in more recent years gives statistics on his observations showing that typical outlet contraction in which external measurements were normal with a transverse diameter of 8 c.m. or less, occurred in 6.9 per cent of his cases. He believes the majority of such cases to be due to the presence of a sixth vertebra in the sacrum, producing the so-called high assimilation pelvis. The relation of the sacroiliac joints is so changed as to permit the lower portions of the innominate bones to approach each other.

Schauta believed the outlet contraction other than the osteomalacia and kyphotic types to be an anomaly of development by which the pelvic bones are lengthened downward and the weight of body being thrown backward upon the sacrum.

The frequency of outlet contraction is being emphasized by many men at the present time. Various instruments and methods have been devised for determining with fair accuracy, the diameters of the pelvic outlet. Roughly, the transverse diameter may be estimated by trying to force the closed fist between the ischial tuberosities, or the tuberosities may be palpated and the distance between them estimated by inspection. More accurate measurement may be made by various pelvimeters which have been designed for this purpose, such as, the Williams, Little, Breisky and Skutsch instruments. Rudolph Klien, one of the pioneers in outlet pelvimetry, designated what is known as the posterior sagittal diameter and made an instrument for measuring it. The Thoms instrument which is now used is a modification of the instrument originated by Klien. Klien concluded that the posterior sagittal diameter must compensate for the narrowing of the transverse diameter in order for spontaneous labor to occur. That when the transverse diameter was 8.5 to 9 c.m., the posterior sagittal must be at least 7 c.m., and that when the transverse is 8 c.m. the posterior sagittal must be 9 c.m. in order to compensate. Klien estimated the normal posterior sagittal at 9.75 c.m., the anterior sagittal at 6 c.m., and the anterior posterior measurement at 11.5 c.m.

Rules are frequently referred to which are helpful in determining the relationship of the transverse and the posterior sagittal diameters, and the probability of normal labor.

1. The total sum of the transverse and the posterior sagittal measurements should exceed 15.5 c.m.

2. The transverse multiplied by the posterior sagittal measurement, and that sum divided by two should give an outlet value of not less than 25. This value is indicative of an extreme contraction which in many cases would require Caeserean section.

There are two methods of obtaining the posterior sagittal diameter: First, by measuring with the Thoms posterior sagittal pelvimeter; second, by a direct manual method which requires digital palpation per rectum, or vagina.

The posterior sagittal diameter when taken by the Thoms instrument requires assistance to manipulate.

In the direct manual method, digital palpation is made, per rectum, of the sacrococcygeal joint, and the distance upon the finger is measured to the center of the transverse diameter. In this method a modified Williams transverse pelvimeter is used. The modification consists of a small rod between the points of the instrument. An ordinary rubber band may be used to serve the same purpose with the Williams instrument. The Little instrument is even more convenient in this method, since it is more easily controlled with one hand, leaving the other free for rectal examination.

The following table represents the measurements and the computation of their outlet values in 25 cases. The posterior sagittal diamter has been taken by the two methods which I have previously described, and the mean of both is used in computing the outlet values.

No.	Transverse	Posterior Sagittal		Mean.	Outlet Value		Type of Labor.
		Method 1.	Method 2.		Rule 1.	Rule 2.	
1	9.25	8.5	9.5	9.	18.25	41.6	Normal
2	9.25	8.25	8.5	8.37	16.72	38.7	Normal
3	9.	8.	8.5	8.25	17.25	36.7	Prolonged
4	10.	8.5	9.25	8.87	18.87	44.3	Normal
5	10.25	8.5	9.25	8.87	19.29	43.6	Oc. Post.
6	9.5	8.25	9.25	8.75	18.25	41.	Normal
7	10.5	9.25	9.25	9.25	19.75	48.5	Normal
8	10.	8.5	8.5	8.5	18.50	42.5	Normal
9	9.5	8.	8.75	8.37	17.87	39.7	Prolonged
10	10.	8.	8.5	8.25	18.25	42.5	Normal
11	9.25	7.	8.	7.5	16.25	34.7	Forceps
12	9.5	8.	8.5	8.25	17.25	39.2	Normal
13	8.75	7.75	8.	7.87	16.62	38.	Normal
14	8.5	7.	8.	7.5	16.	31.9	Forceps
15	10.25	8.	8.25	8.12	18.37	41.6	Normal
16	7.75	7.	7.	7.	14.75	27.1	Forceps
17	10.25	7.5	7.75	7.67	17.91	39.3	Normal
18	9.5	7.25	8.5	7.87	17.37	37.4	Normal
19	8.5	6.	7.25	6.67	15.16	28.1	Forceps
20	10.	9.25	9.25	9.25	19.25	46.2	Normal
21	8.5	7.25	7.75	7.5	16.	31.9	Normal
22	9.	6.25	6.5	6.37	16.37	21.7	Forceps
23	8.75	7.25	7.25	7.25	16.	31.7	Normal
24	8.5	7.75	8.	7.87	16.37	33.5	Normal
25	9.	7.25	8.	7.67	16.67	34.5	Normal

In these 25 cases there were 18 spontaneous normal labors and 7 prolonged labors of 24 hours or longer. Three of the prolonged cases delivered themselves, one being a persistent occiput posterior. The other two were primiparous patients and episiotomy was done in each case. The four other prolonged cases were delivered by forceps, four of which were difficult, and first or second degree laceration was obtained in each case.

In one case which had an outlet value of 27.1, there was much difficulty in the forceps delivery. The child weighed only 5.5 pounds and a second degree laceration was obtained.

Out of this series only one case had a transverse diameter of less than 8 c.m., which was the case with the outlet value of 27.1.

Six cases of the series were considered as borderline contracted outlet cases, and four of them delivered without prolongation of labor.

The average of the measurements and values was as follows: Transverse diameter 9.46 c.m.; posterior sagittal by pelvimeter 7.77 c.m; posterior sagittal by manual palpation 8.25 c.m.; outlet value by rule 1, 17.36 c.m.; outlet value by rule 2, 37.8.

Summary of outlet values in the prolonged cases:

Rule 1.	Rule 2.	Type of Labor	Weight of Baby	Laceration
17.25	36.7	Episiotomy.	7 lbs., 11 ozs.	1°
19.20	43.6	Oc. Post.	7 lbs., 5 ozs.	0
17.87	39.7	Episiotomy.	7 lbs., 6 ozs.	1°
16.25	34.7	Forceps, easy	7 lbs., 4 ozs.	0
14.75	27.1	Forceps, hard.	5 lbs., 8 ozs.	2°
15.16	28.1	Forceps, hard.	6 lbs., 1 oz.	1°
16.37	27.7	Forceps, hard.	6 lbs., 8 ozs.	2°

Practice of obstetrics may be classified into three periods of time: 1, the prenatal period; 2, the operative period, and 3, the puerperal period. Each period may vary in duration of time, but the one is dependent upon the other respectively and carries with it the same aim and ideal, that is, to obtain a living mother, a living child, and a satisfactory end result.

Prenatal obstetrics gives ample opportunity for study and diagnosis, which becomes very

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important in the proper conduction of the operative obstetrics, or delivery.

The physician who sees a case for the first time after labor has progressed for a time is handicapped, when the conduction of this case is compared with a similar case which has had a prenatal study. Let us suppose that in each case there is a like complication, for instance, a contracted outlet. In the first case perhaps the patient will have been in hard labor for some little time. The head might be arrested at the outlet, and in sight through the vulva. The fetus would be average if not oversized. There may be a beginning fetal distress. After determining the cause of the dystocia, then the proper treatment, or more probably the best treatment, has to be carried out at whatever cost. Consider the case which has been studied in the prenatal period. The conduction of this case may not always be ideal, but a diagnosis of the outlet contraction has been made early. The relative size of the passenger and the passage has been studied. Each factor is considered with careful judgment, keeping in mind that spontaneous parturition, even slow, is better. The degree of contraction may vary from a minimum to an intermediate or to a maximum quantity. The treatment would vary accordingly, and should be the one which offers the best chance for a living child and a normal puerperium for the mother. With a minimum contraction, no great amount of dystocia will result as a rule, and delivery usually occurs spontaneously.

Sometimes a moderate outlet contraction can be corrected by the postural treatment during labor, which consists in abducting and flexing the thighs while patient is in the prone position. This position causes a slight rotation of the innominate bones about the sacrum in such a way as to cause a definite increase in the size of the outlet. This increase may be just enough to change a hard into an easy forceps delivery.

An intermediate outlet contraction may require a premature induction of labor or, if seen late, some radical procedure may have to be done. Forceps, version, and pubiotomy carry with them a definite danger in obtaining a satisfactory end result in such cases.

Maximum outlet contraction may have as the choice either Caeserean section or pubiotomy. Stone[3] has recently reported two cases of outlet contraction which necessitated delivery by Caeserean section. In one of his cases preliminary external measurements were normal. The bituberal diameter was 5.75 c.m. and the posterior sagittal diameter was 8.5 c.m. A Caeserean was chosen over pubiotomy with satisfactory results.

In conclusion there are a few points which I wish to stress: The pubic arch is always to be considered in obstetrics and should be measured in each routine prenatal examination.

Any measurement of the transverse diameter which is 8 c.m. or less should be studied as to its outlet value.

Delivery is not dependent upon the measurement of either the transverse or the posterior sagittal diameters in a contracted outlet, but upon the compensating length of the one to the other.

Outlet contractions[4] occur in about 7 per cent of all cases and are one of the frequent causes for dystocia. The occiput in some of these cases is frequently visible at the vulva. Forceps delivery of the cases which are arrested at the outlet is often difficult.

Tissues over the spines are subject to necrosis and laceration in outlet contractions since unusual pressure is exerted upon them when delivery is being accomplished by the compensating effect of the posterior sagittal capacity. Severe lacerations of the perineum are frequently caused by a contraction of the outlet.

Lastly, the degree of contraction of the outlet is to be considered together with the probable disproportion of the fetal head in determining the possibility of normal spontaneous delivery.

REFERENCES.

1. Williams. Text Book upon Obstetics. p. 265.
2. Williams. Etiology, Frequency and Practical Significance of Outlet Contractions. Surg., Gyn. & Obst. vii:L19, 1909.
3. Stone. Amer. Jour. Obs. & Gyn. Vol. viii. Nov., 1924. p. 625.
4. Williams. Text Book upon Obstetrics. p. 750.

400 *Fairfax Avenue.*

Better Care for Mothers.

A nation-wide movement to improve maternity conditions has been begun by the American Gynecological Society, the American Child Health Association, and the American Association of Obstetricans, Gynecologists and Abdominal Surgeons.

Clinical Reports

A CASE OF TYPHOID PERFORATION WITH RECOVERY.*

By RICHARD MASON, M. D., The Plains, Va.

Going into the bank one morning to transact some business, the cashier, a young man of 25, stopped me to say that he was feeling a "little bilious," and asked if I had any calomel with me. Having my medicine case with me and being in a hurry, I gave him some calomel pellets, with directions how to take them, and went on my rounds, dismissing the incident from my mind.

However, on going into the bank the following afternoon, he again stopped me, saying the medicine had acted very well but that he still felt a little out of sorts and not just up to the mark. Not being in such a hurry this time, I looked him over a little more carefully, taking his pulse, temperature and respiration and found nothing out of the normal except a temperature of 101. As there had been a good deal of typhoid in the neighborhood at that time, I immediately became suspicious and advised him to go home and go to bed, and let me see him the next day. At the same time I gave him some general directions about his diet, etc.

The following morning when I saw him at 11 o'clock, I found him with pulse, temperature and respiration all normal, tongue clean, feeling good and anxious to get up and go to the bank to work. However, to be on the safe side, I advised him to remain in bed, on a restricted diet, and let me get his evening temperature. Being a man of unusual intelligence, he consented to do so.

The temperature that evening went up again to 100 or 101, falling again to normal the following morning. This morning remission, or I should say intermission, and evening exacerbation of temperature continued for several days without any further developments till the afternoon of the third day when I was off in the country about seven or eight miles on horse back. I received a phone call to come at once as Mr. K. was very ill.

When I got back I found him doubled up with an acute pain in the right side of the abdomen, most intense in appendix region and so severe that I had to give three hypodermics of morphia before he got any relief whatever. In the meantime I called Dr. Jas. F. Mitchell, of Washington, telling him I was bringing in a surgical case on the next train, that I thought would need immediate operation.

When we arrived at the hospital several other doctors happened to be there, and when Dr. Mitchell came out of the operating room and said "Well, what have you got this time?" I gave him briefly the history as above, saying, "You ask me what I've got; I suspect typhoid, but believe I'll just let you make the diagnosis after you've cut in." The other doctors present became interested and after we had been to the patient's room for further examination, there was a good deal of discussion as to whether the case would prove one of ruptured appendix or typhoid perforation, Dr. Mitchell inclining to the latter.

On going in he had no difficulty in finding a large, jagged perforation in the ileum, a few inches above the ileocecal junction, and along the small gut for some distance above the appendix there could easily be seen several purplish discolored splotches, indicating the site of other infected glands. The perforation was repaired and the patient hurried off to his room in a condition of extreme shock bordering on collapse, and I think Dr. Mitchell was much relieved when he came down the next morning to find, instead of having to write a death certificate, the patient was smoking a cigarette and talking cheerfully to his nurse.

On coming out of the operating room, one of the doctors who had bet it would turn out a case of ruptured appendix, apologized to me for, as he expressed it, "doubting my diagnosis." I said, "I beg your pardon but I did not make any diagnosis. I stopped making those fifteen years ago. I only said I suspected typhoid."

There was no further rise of temperature after the operation and the patient made a rapid and uneventful recovery.

I have reported this case because it seemed to me to be one of unusual interest both from a medical and surgical standpoint—from a medical standpoint, because it suggests that there may be quite a number of cases of mild typhoid with almost no symptoms of the disease, as was the case with this patient, who had none of the classical symptoms such as continued fever, prostration, sordes, rose-spots,

*Reported before the fifty-fifth annual meeting of the Medical Society of Virginia, at Staunton, October 14-17, 1924.

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tympanites, etc. Had not this particular ulcer happened to penetrate deeply enough to rupture the serosa, he would probably have gone on to recovery without anyone ever knowing that he had typhoid fever. These mild cases are usually diagnosed as "para-typhoid," "walking typhoid," "gastric fever," etc., and continue to go about acting as carriers, not in the usual sense of the chronic carrier, but as carriers, nevertheless.

I omitted to mention that two negative Widals were obtained from this patient between the time I first saw him and the operation. The blood culture test had not at that time come into general use.

From a surgical standpoint the case is of course, of unusual interest, because a timely surgical operation unquestionably saved the patient's life.

Correspondence

Poisoned From Drirking Cider.

Bedford, Va.,
November 20, 1924.

To the Editor:

In response to your request for information as to the poisoning at the Elks National Home, Bedford, Va., facts are as follows:

At luncheon, November 10, 1924, cider was served to some of the brothers at the Home. We were never able to ascertain just how many drank of cider from the poisoned keg as cider was also served from another container, but suppose that every one drinking of the poisoned cider was immediately affected. Twenty-eight of the brothers and three servants were made sick. Immediately after drinking the cider, in some cases before they could reach their rooms in the cottages, those affected became violently sick with nausea, vomiting, retching, purging, straining, tenesmus, etc. They had violent griping pains in the stomach, pains in the muscles, especially in the back and in the calves of the legs, with muscle tremor; they were cold, clammy, often with profuse sweating, sunken eyes and cheeks; a dusky, congested appearance of the face; more or less shock in all and some had total collapse and coma in a short while; all had a profoundly disturbed circulation, with weak, fast, irregular, thready pulse and failing heart action.

Within five hours, one died, and seven more died within seventeen hours. One died after thirty hours, one after forty-two hours and one lived fifty-four hours, making a total of eleven deaths to date. It is likely that one of the living ones, eighty-six years of age, will die. The rest of those affected by the cider are doing quite well and most of them are up and around. The three servants are also doing well.

Dr. Lawson and Dr. Cattenach, of Jefferson Hospital, Roanoke, Va., are collaborating with me in the treatment of these cases and we will later give a full scientific report. Arsenic was found in abundance by laboratory test of the cider and later found to have been contained in a keg previously used for "Squier's Mud Killer," a water soluble preparation of arsenic.

J. A. Rucker, M. D.
Physician to the Home.

Proceedings of Societies

Arlington County Medical Society.

At the November meeting of this Society, the following officers were elected for the ensuing year: Dr. J. H. Walton, Cherrydale, president; Dr. Edward McCarthy, Cherrydale, vice-president; Dr. B. H. Swain, Ballston, secretary-treasurer. It was decided hereafter to hold the meetings quarterly, in February, May, August and November.

This meeting was largely and enthusiastically attended and many subjects of importance discussed. A committee, consisting of Drs. R. N. Sutton and B. H. Swain, was appointed to revise and correct the prices for surgical and medical attendance to higher figures, so as to conform more to the prices charged by the members of the District of Columbia Medical Society, and it was decided to publish the revised prices in the county papers.

B. H. Swain,
Secretary-Treasurer.

The Accomack County Medical Society

Held its regular meeting in the Drummondtown Tavern, November 5, 1924, at which time the following officers were elected for the ensuing year: Dr. W. M. Burwell, Chincoteague, president; Dr. W. W. Kerns, Bloxom, vice-president; Dr. John W. Robertson, Onancock, secretary-treasurer (re-elected).

Letters of sympathy were ordered written to Drs. Rooker J. White, Keller, and Oscar L. Powell, Onancock, incident to their sickness.

Dr. John H. Ayres was appointed to draft suitable resolutions of respect in memory to Dr. Edgar W. Robertson, deceased.

Dr. Knott, of the County Health Unit, was elected an honorary member of the Society.

It was decided to hold the annual banquet at the Drummondtown Tavern on December 19, 1924, and the physicians of Accomac C. H. were appointed a committee to arrange same.

It was decided to hold meetings quarterly in the future.

JOHN W. ROBERTSON,
Secretary.

The South Piedmont Medical Society

Held its semi-annual meeting in Danville, Va., November 18. The program included a number of interesting papers and the meeting was well attended. It was decided to hold the next meeting in South Boston, Va., in April, 1925. Dr. Ray Moore, Phenix, and Dr. George A. Stover, South Boston, are president and secretary, respectively.

The Truth About Medicine

In addition to the articles enumerated in our letter of September 27th, the following have been accepted:

Battle Creek Food Company
- Lacto-Dextrin

Eli Lilly and Company
- Pituitary Extract—Lilly (Obstetrical)
  - Pituitary Extract—Lilly (Obstetrical), 0.5 c.c.
  - Pituitary Extract—Lilly (Obstetrical), 1 c.c.
- Pituitary Extract—Lilly (Surgical)
  - Pituitary Extract—Lilly (Surgical), 1 c.c.

Medical Laboratories, Inc.
- Culture Bacillus Acidophilus—Medical Laboratories, Inc.

Merck and Company
- Barbital—Merck
- Barbital Sodium—Merck
- Carbon Tetrachloride—Merck Highest Purity "C. P."

H. K. Mulford Company
- Cargentos Capsules, 3 grains
- Cargentos Ointment, 5 per cent.
- Diphtheria Toxin—Antitoxin Mixture, New Formula (Park Banzhaf's 0.1 L+ Dose)—Mulford

Nutrivoid Diabetic Flour Company
- Nutrivoid Flour

Parke, Davis and Company
- Antidysenteric Serum—P. D. and Co., 20 c.c. syringe.

Powers-Weightman-Rosengarten Company
- Quinine Ethyl Carbonate—P. W. R.

NEW AND NON-OFFICIAL REMEDIES.

Meroxyl.—A mixture containing approximately 50 per cent of the sodium salt of 2,4-dihydroxy-3,5-dihydroxymercuribenzophenone-2'-sulphonic acid, with foreign matter containing ammonium 2,4-dihydroxybenzophenone-2-sulphonate, sodium acetate and water. Meroxyl is a local antiseptic and germicide proposed for use in superficial infections. It is used for wet dressings of wounds, and also for irrigation of wounds and infected bladders. Meroxyl is marketed in the form of tablets containing 0.15 Gm. Hynson, Westcott and Dunning, Baltimore. (Journal A. M. A., Oct. 4, 1924, p. 1079).

Metaphen.—Bisacetoxymercuri-4-nitro-2-cresol. It contains from 58 to 60 per cent. of mercury in organic combination. Metaphen is a germicide, more powerful than mercuric chloride and certain organic mercury compounds when tested on cultures of *Staphylococcus aureus* and *Bacillus typhosus*. It is stated to be relatively non-irritating when applied to mucous membranes or the skin, and to be without deleterious action on metallic instruments or rubber. Metaphen is proposed for use in the treatment of gonorrhea, infections of the eye, for skin sterilization and for sterilization of instruments and rubber. It is insoluble in water and for use, solutions must be prepared with the aid of sodium hydroxide. It is supplied in the form of metaphen solution 1:5,000. Abbott Laboratories, Chicago. (Journal A. M. A., Oct. 11, 1924, p. 1167).

Sterile Ampules Mercury Benzoate 2 per cent., 1 c.c.—Mercuric benzoate—N. N. R. (New and Non-official Remedies, 1924, p. 200, 0.02 Gm. (1/3 grain), in a solution of sodium chloride 2.5 per cent., 1 c.c. Swan-Myers Co., Indianapolis.

Sterile Ampules Mercury Succinimide, 0.01 Gm. (1/6) gr.—Mercuric succinimide—N. N. R. (New and Non-official Remedies, 1924, p. 204), 0.01 Gm., in water 1 c.c. Swan-Myers Co., Indianapolis.

Sterile Ampules Mercury Salicylate, 0.065 Gm. (1 grain).—Mercuric salicylate—U. S. P., 0.065 Gm.; benzocaine—N. N. R., 0.02 Gm., in neutral vegetable oil, 1 c.c. Swan-Myers Co., Indianapolis.

Sterile Ampules Mercury Biniodide, 0.01, Gm.; (1/6 grain).—Mercuric salicylate—U. S. P., 0.097 Gm.; benzocaine—N. N. R., 0.02 Gm., in neutral vegetable oil, 1 c.c. Swan Myers Co., Indianapolis.

Sterile Ampules Mercury Biniodide, 0.01. Gm.; (1/6 grain) in oil.—Red mercuric iodide—U. S. P., 0.01 Gm. suspended in pure cottonseed oil, 1 c.c. Swan-Myers Co., Indianapolis.

Concentrated Tetanus Antitoxin (Globulin).—Tetanus antitoxin, concentrated (New and Non-official Remedies, 1924, p. 297), marketed in packages of one syringe containing 10,000 units; in packages of one syringe containing 20,000 units; in packages of one cylinder containing 5,000 units for intraspinal use; in packages of one cylinder containing 10,000 units with intravenous outfit. Lederle Antitoxin Laboratories, New York.

Antipneumococcus Serum, Type 1.—Antipneumococcus serum (New and Non-official Remedies, 1924, p. 304), marketed in packages of one cylinder containing 100 c.c. with intravenous outfit; in packages of one vial containing 100 c.c. Lederle Antitoxin Laboratories, New York.

Antistreptococcic Serum, Polyvalent.—Antistreptococcic serum (New and Non-official Remedies, 1924, p. 305), marketed in packages of one syringe containing 20 c.c.; in packages of three 10 c.c. vials; in packages of one vial containing 50 c.c.; in packages of one vial containing 100 c.c.; in packages of one cylinder containing 100 c.c. with intravenous outfit. Lederle Antitoxin Laboratories, New York.

Acne Vaccine.—Acne vaccine (New and Non-official Remedies, 1924, p. 316), marketed in packages of four vials containing respectively, 5, 10, 20 and 40 million killed acne bacilli; in packages of one 5 c.c. vial containing 40 million killed acne bacilli per c.c.; in packages of one 10 c.c. vial containing 40 million killed acne bacilli per c.c. Lederle Antitoxin Labora-

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tories, New York. (Journal A. M. A., Oct. 18, 1924, p. 1245).

Staphylococcus Vaccine Polyvalent—Lederle.—Staphylococcus Vaccine (New and Non-official Remedies, 1924, p. 324), marketed in packages of one 5 c.c. vial containing 800 million killed *Staphylococcus albus*, 800 million killed *Staphylococcus aurcus* and 400 million killed *Staphylococcus citreus* per c.c.; in packages of one 10 c.c. vial, containing 800 million killed *Staphylococcus albus*, 800 million killed *Staphylococcus aureus* and 400 million killed *Staphylococcus citreus* per c.c. Lederle Antitoxin Laboratories, New York.

Pneumococcus Vaccine Polyvalent—Lederle.—Pneumococcus vaccine (New and Non-official Remedies, 1924, p. 322), marketed in packages of one 5 c.c. vial containing 3,000 million killed pneumococci per c.c. Lederle Antitoxin Laboratories, New York.

Typhoid Vaccine (for prophylactic treatment)—Lederle. Typhoid vaccine (New and Non-official Remedies, 1924, p. 326), marketed in packages of 30 vials; in packages of one 5 c.c. vial containing 1,000 million killed typhoid bacilli per c.c.; in packages of one 20 c.c. vial containing 1,000 million killed typhoid bacilli per c.c. Lederle Antitoxin Laboratories, New York.

Typhoid Combined Vaccine Prophylactic.—Lederle. Typhoid vaccine (New and Non-official Remedies, 1924, p. 326), marketed in packages of 30 vials; in packages of one 5 c.c. vial; in packages of one 20 c.c. vial. Lederle Antitoxin Laboratories, New York. (Journal A. M. A., Oct. 25, 1924, p. 1335).

PROPAGANDA FOR REFORM.

Pluriglandular Products of Harrower.—In 1919, the Council on Pharmacy and Chemistry examined a number of the products of the firm of Henry R. Harrower, Glendale, California. It found none acceptable for New and Non-official Remedies. An examination of the "literature" sent out by the firm during the last year shows that its business is still largely in complex mixtures such as those reported on adversely by the Council. (Journal A. M. A., Oct. 4, 1924, p. 1098).

New Wilson Remedy Co.—Recently some physicians in Ohio received letters from the New Wilson Remedy Co., giving as its address 1042 St. Clair Avenue, Cleveland, Ohio, suggesting they "become interested in getting the profits from medicines that usually go to outsiders." They were informed that it was proposed to purchase the entire formula, stock, name, etc., of the present New Wilson Remedy Co., which now sells "Wilson's Pills," formerly known as "Wilson's Pills of Life," and stated to have proven "very effective" in "Chronic Rheumatism, Lumbago, Neuralgia, Sciatica and Menstruation." "The New Wilson Remedy Company" appears to be a trade style used by one George C. McKay. McKay, it is said, is a sales agent for various concerns and his wife apparently takes care of the mail order patent medicine business. The "Company" merely has desk room at 1042 St. Clair Avenue, Cleveland. (Journal A. M. A., Oct. 4, 1924, p. 1096).

Benzyl Benzoate and Arterial Hypertension.—While the Council on Pharmacy and Chemistry recognizes the existence of honest differences of opinion on many therapeutic questions, and desires to be liberal in its attitude toward all worthy innovations, it refuses to admit claims which are neither in harmony with already accepted facts nor supported by acceptable evidence. The wisdom of this rigorous attitude has been recently demonstrated anew with respect to the widely acclaimed benzyl benzoate. The Council has insisted that its clinical use is still in the experimental stage, despite the alluring announcements of the various alleged virtues of the compound. Benzyl benzoate has, for example, been recommended and doubtless frequently prescribed for reduction of arterial hypertension. A careful clinical study, however, shows that benzyl benzoate, if taken in 25 to 30 drop doses (20 per cent. alcoholic solution), has no effect on blood pressure. Furthermore, even continued therapeutic administration over a period of days produced no effect on the blood pressure of patients suffering with hypertension. (Journal A. M. A., Oct. 11, 1924, p. 1171).

Some "Mixed" Vaccines of G. H. Sherman Not Accepted for N. N. R.—The Council on Pharmacy and Chemistry reports that the following "mixed" vaccines of the firm of G. H. Sherman were found to be unacceptable for New and Non-official Remedies: Erysipelas Vaccine No. 1, Pneumo. Mixed Vaccine No. 6, Strepto. Staph. Vaccine No. 10, Colon Bacillus Combined Vaccine (Modified Van Cott), No. 35, Friedlander Vaccine No. 36, Influenza Vaccine No. 38, Catarrhal Vaccine No. 40, Whooping Cough Mixed Vaccine No. 43. As evidence for these "mixed" vaccines the firm submitted a printed brochure. "Data on the Use of Mixed Bacterial Vaccines." Part of the data consisted chiefly of the reproduction of letters from physicians—some of them men of high standing—testifying to the value of "mixed" vaccines in various conditions. The other part of the data consisted of abstracts or reprints of articles which have appeared in medical publications. This evidence the Council found unacceptable. The evidence for the several vaccine mixtures under consideration did not establish the rationality of any of them. On the contrary, their use is bound to lead to haphazard therapy—particularly so, because the trend of the Sherman advertising which accompanies the products is toward the use of vaccine mixtures. This includes a complete line of Sherman vaccines and contains a long list of diseases with recommendations for the use of vaccines, generally referred to by numbers rather than by names descriptive of their composition. (Journal A. M. A., October 11, 1924, p. 1184).

Jack Sprat Bread, Another Obesity Cure Fake.—This bread is put on the market by Charles Sulzer and Co., Chicago, and proclaimed by Sulzer to be "My Magical Discovery." It is said to be "rich in protein" and "unusually low in starch." It is claimed " * * * easily and pleasantly Jack Sprat restores the beauties of form and features." Analysis shows that Jack Sprat Bread has between 29 and 33 per cent of starch and a total carbohydrate content of 36 to 40 per cent. It seems to be a very ordinary product which is a hybrid between a gluten and a whole wheat bread. The statement that the bread is unusually low in starch content is false. It is not true, as claimed, that the obese can reduce by eating all they want, whenever they want it. The claim that "Nothing can reduce you as Jack Sprat will" is sheer quackery. (Journal A. M. A., Oct. 18, 1924, p. 1261).

Gomenol.—Gomenol is a volatile oil obtained from a plant related to the plant that yields oil of cajuput. It is very similar to oil of cajuput and its therapeutic properties probably are also like it. Gomenol comes as a proprietary from France and it is exploited under extravagant claims. (Journal A. M. A., Oct. 18, 1924, p. 1264).

Carnrick's Organotherapy.—The G. W. Carnrick Co. sends out a 253-page brochure, "Organotherapy in General Practice," which evidently is intended to promote the use of the pluriglandular products which this firm exploits. The following appears under the

heading "Insulin in Treatment": "For the routine treatment of diabetes of the mild or moderately developed type, extending over years, the daily or twice daily injection of an expensive product has failed to meet the requirements. Oral administration appears to be the only satisfactory method for this long continued treatment in the home. Numerous extracts have been prepared for oral administration and have proved successful in reducing blood sugar and correcting disturbed carbohydrate metabolism. Berkeley, Wallis, Achard and others have prepared extracts which gave good results clinically and Banting and Best and Murlin have given experimental evidence of the value of such extracts by administration through the stomach. No pancreas preparation, however, has received as extensive clinical trial as Trypsogen." An insulin preparation, effective when administered orally, would be most desirable. But there is no evidence to indicate that such a preparation has been evolved. The caution still holds good: "It is desirable to give wide publicity to the current limitations of a most promising therapy, since unscrupulous venders of drugs are already attempting to distribute the just-as-good pancreatic and antidiabetic preparations that are recommended for oral use." (Journal A. M. A., Oct. 18, 1924, p. 1264).

St. James Oil.—For many years one Harry Ellington Brook conducted a department of medical and quasimedical misinformation in the Sunday Magazine Section of the Los Angeles *Times*. Brook was a "Nature Doctor" and a chiropractor. Brook advertised in the Los Angeles *Times* to restore health by natural methods. He was an exponent of drugless therapy, but he was not above exploiting a "patent medicine." A fraud order recently issued by the Postoffice Department against Brook and the "St. James Oil Company," brings out the fact that Brook had for years been engaged in exploiting a nostrum called "St. James Oil," at the same time that he was inveighing against all drugs in his department in the Los Angeles *Times*. Analysis showed the product to be 98 per cent mineral oil, resembling liquid petrolatum and 2 per cent volatile oils of eucalyptus and of lemon. (Journal A. M. A., Oct. 25, 1924, p. 1353).

Book Announcements

A Manual of Diseases of the Nose, Throat, and Ear. By E. B. GLEASON, M. D., LL. D., Professor of Otology, Medico-Chirurgical College Graduate School, University of Pennsylvania. Fifth Edition, thoroughly revised. Philadelphia and London. W. B. Saunders Company. 1924. 12mo. 660 pages, 212 illustrations. Cloth, $4.00 net.

The fifth edition of this handy manual has been thoroughly revised and made to conform to the very latest ideas in this particular field. Among the many interesting additions may be mentioned the newer methods of local anesthesia, biologic therapeutics, etc. It is an ideal book for the general practitioner as well as a quick reference for the specialist. H.

Medical Record Visiting List, or Physicians' Diary. Revised. New York. William Wood and Company, Medical Publishers. Leather binding, with pencil, pocket size. The 60-patients per week size, leather binding, $2.00.

These books for the keeping of records of patients are gotten up in neat style and in convenient size. Included in the book are twenty-seven pages with much practical information which many physicians like for reference.

Pediatrics. By various authors. Edited by ISAAC A. ABT, M. D., Professor of Diseases of Children, Northwestern University Medical School, Chicago. Volume IV., containing 1,271 pages, with 218 illustrations. Philadelphia and London. W. B. Saunders Company. 1924. Cloth, $10.00 per volume. Set complete in eight octavo volumes, totalling 8,000 pages with 1,500 illustrations, and separate Index Volume, free. Sold by subscription.

The American student of pediatrics will no longer have to resort to foreign reference works to get the best information available anywhere in the world on diseases of children. Abt's Pediatrics embraces the entire subject in a manner preeminently noteworthy for devotion to detail, soundness of teaching, and thoroughness of discussion.

Volume III. had for its first article the "Nem" System of Nutrition by Professor von Pirquet of Vienna, followed by a complete series of monographs on the gastro-intestinal tract.

The fourth volume completes the respiratory articles and includes diseases of the blood and genito-urinary systems. A right thorough chapter by Professor Graham, of Washington University, on the "Surgery of the Thorax" indicates that this work will prove of inestimable value to the surgeon. A striking feature of this chapter is that, while it takes only 133 pages, the bibliography has 316 separate references. Dr. Palmer Findley's chapter of 32 pages on "Female Genital Organs" has 149 references.

Professor Samuel Ambery, of the Mayo Foundation, is the author of "The Urine in Infancy and Childhood." With 413 references, this is probably the most complete article in the volume. Among the other prominent contributors to this volume may be mentioned Blackfan, Fleischner, Friedlander, Grulee, Helmholtz, Hempleman, Hoobler, Lucas, etc.

There have been exhaustive treatises on medicine, surgery, and many of the specialties, but here is the first complete American work on Pediatrics in thirty-five years. Every doctor doing any work in this branch will find what he needs in Abt's Pediatrics. H.

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Virginia Medical Monthly

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Editorial

SPECIAL NOTICE

IN ACCORDANCE WITH RESOLUTION ADOPTED AT THE STAUNTON MEETING OF THE MEDICAL SOCIETY OF VIRGINIA, THE PROGRAM COMMITTEE OF THE SOCIETY MET ON NOVEMBER 10, 1924, TO FORMULATE PLANS FOR MAKING THE PROGRAM FOR THE ANNUAL MEETINGS.

THE FOLLOWING RESOLUTION WAS UNANIMOUSLY ADOPTED:

1. NO TITLE SHALL BE ACCEPTED FOR THE PROGRAM PRIOR TO TWO MONTHS BEFORE DATE OF THE ANNUAL MEETING. AT THIS TIME, AS PROVIDED IN THE BY-LAWS, AN ANNOUNCEMENT CONCERNING THE ANNUAL MEETING AND REQUEST FOR TITLES OF PAPERS SHALL BE MAILED BY THE SECRETARY-TREASURER TO ALL MEMBERS OF THIS SOCIETY.

2. ON AND AFTER DATE ON WHICH THESE NOTICES ARE MAILED, TITLES WILL BE RECEIVED UNTIL FIFTY ARE IN HAND. IN THE FIFTY TITLES REFERRED TO, PROVISION SHALL BE MADE FOR THE PAPERS OF THE INVITED GUESTS AND PAPERS ON THE SUBJECT OF GENERAL DISCUSSION.

3. AFTER THE FIFTY TITLES ARE RECEIVED, THE PROGRAM COMMITTEE SHALL ARRANGE AND CLASSIFY THEM ACCORDING TO RELATED SUBJECTS.

ALEX. G. BROWN, Jr., Chairman,
A. L. GRAY,
P. W. HOWLE,
E. L. KENDIG,
B. R. TUCKER,
Committee.

The Standardization of Drugs Amid Changing Standards.†

Medical welfare is hampered in many ways by the machinations of the quack and the health imposter; likewise by the production and distribution of products that are below standard or utterly incapable of accomplishing what the unsuspecting user, be he layman or physician, may rightfully expect of them. Much of the valuable work of the Council on Pharmacy and Chemistry of the American Medical Association consists in revision—in promoting an up-to-date attitude toward well tested novelties in drugs, while preserving a justifiable conservatism toward the valuable contributions of the past. An illustration of the difficulties encountered is afforded by the recent experiences with cod liver oil. The product itself is no novelty, but some of its reputed virtues have been put on a more scientific basis in the last decade. The pharmacopeial standards have been found insufficient. Today it is standardized on its vitamin potency—and more recently on its antirachitic properties. Such tested cod liver oils are widely advertised and have been accepted for inclusion in New and Non-official Remedies by the Council on Pharmacy and Chemistry. Those who believe in keeping abreast of progress should, therefore, lend their enthusiastic support to agencies, such as the Council, that labor unselfishly for them.

†Propaganda for Reform, issued by Council on Pharmacy and Chemistry of the A. M. A.

The Photo-Activity of Substances Curative of Rickets.†

In addition to conspicuous changes in the composition of bones in rickets, disproportions occur in the concentration of calcium and phosphorus in the blood plasma. The chemical make-up of the latter is soon restored to a more normal character whenever effective antirachitic measures are instituted. Cod liver oil has this regulatory power in a striking degree. It is an extraordinary circumstance that a substance containing neither calcium nor phosphorus should have the power to cause the calcium or the phosphorus, as the case may be, to rise nearly to the level commonly regarded as normal. Furthermore, cod liver oil not only acts as a regulator of the calcium and phosphorus metabolism, but also permits the organism to operate with greatly increased economy. No less remarkable than the action of cod liver oil is the clearly demonstrated potency for this purpose of certain types of radiation, such as are present in direct sunlight and which emanate also from the quartz mercury vapor lamp. Because of the similarity of action of cod liver oil and radiant energy, it was predicted that a connection must exist between them. This relation has now been demonstrated. It has been shown that the chemical substances curative of rickets produce a blackening of sensitive photographic plates screened by quartz. Substances noncurative of rickets do not fog the plates. These phenomena are undoubtedly due to ultraviolet radiation. Thus oxidation appears to furnish the basis for the identical curative action of many substances and of sunlight in rickets.

Bottled Sunshine.†

It was demonstrated recently that sunlight or the radiations of the quartz mercury vapor lamp had the property of emitting ultra-violet rays in common with well recognized antirachitic food substances. Almost simultaneously, it was announced that irradiation of fats otherwise inactive in preventing rickets, caused them to become active and that rations which ordinarily produced wide rachitic metaphysis in the shaft bone of rats through irradiation, became antirachitic and promptly effected a rapid and complete healing of the lesion.

An Antidote for Arsenic, Bismuth, and Mercury Poisoning.*

Henry C. Semon, writing in the *British*

*Venereal Disease Information, published by U. S. Public Health Service.

Medical Journal, reported seven cases in which sodium thiosulphate given intravenously has proved an antidote for mercurial and bismuth stomatitis, and has counteracted the effects of acute arsenical toxemia. Doses of 0.45, 0.6, 0.75, and 0.9 gm. were employed. In some cases only one dose was necessary to relieve the condition.

Case I. *Bismuth Stomatitis.*—Jaundice developed during treatment; bismuth was substituted, and a course of intramuscular injections of trepol begun. After the fourth injection soreness of gums and salivation developed. Sodium thiosulphate was administered intravenously, 0.45 gm. followed two days later by 0.5 gm. Treatment was continued.

Case II. *Mercurial Stomatitis.*—Mercurial gingivitis developed after 3 injections of mercurial cream. Sodium thiosulphate in amounts of 0.45, 0.6, 0.75 gm. cleared up the fetor and salivation.

Case III. *Bismuth Salivation.*—Only 0.45 gm. of sodium thiosulphate was needed to clear up condition.

Case IV. *Mercurial Stomatitis.*—A woman developed severe gingivitis after taking hydrargyrum cum creta for about one month. Four doses of sodium thiosulphate relieved all symptoms.

Case V. *Arsenical Jaundice.*—After six intravenous injections of novarsenobillon given at intervals of three weeks jaundice developed. Intravenous injection of 0.75 gm. of sodium thiosulphate in 10 c.c of water was immediately given. Daily doses were continued for 10 days. Nausea and depression disappeared.

If actual tissue destruction has already occurred and so-called yellow atrophy of the liver has set in, improvement can not be expected. Therefore, early treatment is most necessary.

Case VI. *Acute Dermatitis After Two Sulpharsenol Injections.*—Following the second injection of 0.36 gm. of sulpharsenol intravenously, an acute irritable eruption appeared, mainly on the trunk and arms, resembling a serum urticaria. An injection of 0.5 gm. of thiosulphate was given at once. The following morning the pruritus had subsided; the dose was repeated. Slight desquamative reaction supervened 48 hours later; patient made an uninterrupted recovery in five days.

Case VII. *Mercurial Stomatitis and Eruption.*—In this case the condition followed the intravenous injection of one-sixteenth gr. of mercury perchlorid for severe septicemia. Because of the patient's dread of further injections, the thiosulphate was administered by mouth. The stomatitis began to improve at once and the rash showed signs of involution and began to desquamate slightly on the fourth day, but patient developed severe colic and the treatment was abandoned. This indicates that the intravenous route is more rapid and less toxic.

An additional case is cited to show that painful subcutaneous infiltration following an extravenous leak of novarsenobillon can be avoided by injecting instantly a solution of 0.75 gm. of sodium thiosulphate in 8 c.c. of distilled water, so as to mix with and dilute the novarsenobillon.

The Modern Therapy of Syphilis.*

The Canadian Medical Association Journal contains an article by H. C. Mersereau which states that arsphenamin and neoarsphenamin are high in trypanocide power; the therapeutic index is about the same, but neorsphenamin is more unstable. Sulpharsphenamin and gelatin arsphenamin have not yet been tried out sufficiently for a final decision but experiments indicate that these drugs may render treatment of syphilis simpler, quicker, and safer. Tryparsamide has a low therapeutic index but it is of value in the treatment of neurosyphilis on account of its greater power of permeating the tissues. Mercury in the form of mercurosal, administered intravenously, seems to be producing good results. Bismuth in the form of neotrepol has proved of value in Wassermann fast cases. How often the arsenicals are to be used and whether mercury should be administered at the same time are questions which are still debated.

Milk Injections in the Treatment of General Paralysis.*

The Budapest correspondent, to the London *Lancet*, says that Moravcsik, from experiments carried out in his psychiatric clinic, states that, in view of the results obtained, milk is the most efficacious of the nonspecific remedies, and that the results of milk injections were much superior to those obtained by antisyphilitic treatment in general paralysis of the insane.

The explanation, which is at present only theoretical, is that the efficacy of the treatment is due to leucocytosis, activation of the protoplasm, stimulation of antibody forming ele-

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ments, increased transfusion, and hyperemia in the diseased foci.

On Transmission of Congenital Syphilis.*

L. F. Meyer, in *Monatschr. f. Kinderh.*, Leipzig, tells of a child who developed a syphilitic umbilical ulcer when six weeks old. In the German medical literature syphilitic umbilical ulcer is not acknowledged and, therefore, the diagnosis of diphtheria was suggested. Diphtheria bacilli, however, were absent and the induration of the borders of the ulcer and swelling of inguinal glands suggested syphilis. Typical spirochetes were then found in the umbilical smear. The Wassermann reaction so far had been negative. After another three weeks, bloody rhinitis, diffuse infiltration, swelling of the spleen, and dropping of the nasal ridge set in. The Wassermann reaction became positive in the eleventh week.

Hutinel and others in France have given credence to the existence of umbilical ulcer and Hutinel says that it may be the only symptom for a long time. Since the discovery of the spirochetes, prompt treatment is possible.

The author reports a total of five cases. He recommends microscopic examination for spirochetes in all cases where the navel is moist.

These cases are interesting from an etiological viewpoint. Three possibilities must be taken into consideration, germ transmission, infection *ex patre*, and placental transmission. The last theory at the present time has the most adherents. Rietschel is of the opinion that infection of the infant occurs most frequently during birth, and more particularly during expulsion, when the placenta tears and the maternal and fetal blood intermix. In 1903, Bondi described an infiltration of the vascular muscles with leucocytes. Inflammation in the fetal part of the umbilical cord he considers characteristic of syphilis. Grafenberg found spirochetes in the umbilical blood vessels.

The fact that this ulcer exists before other syphilitic symptoms suggests that the infection is not transmitted from child to mother, but from mother to child. The transmission may occur through transportation within the umbilical blood or the spirochetes travel in the lymph spaces of the umbilical cord.

The author does not consider umbilical ulcer a primary lesion on account of the rapid sequence of supervening symptoms. It is more probable that soon after the focal formation of the spirochetes a blood invasion takes place.

Wassermann Reaction in Different Social Classes.*

David L. Belding and Isabelle L. Hunter, in the *American Journal of Syphilis*, state that:

"The per cent of positives in Wassermann surveys in pregnant women varies from 3.05 to 31.11. This variation is due in part to differences in the social position, race, and nationality of the patients and in part to certain technical factors in performing the test.

"The results obtained by 24 investigators in routine Wassermann tests in 19,739 pregnant women, both negro and white, give an average of 9.8 per cent positive. Excluding the greater part of the negroes, 7.5 per cent were positive.

"In our series of 5,198 cases, which included 3.5 per cent negroes, 9.2 per cent were positive and doubtful and 7.8 per cent were definitely positive.

"Investigators with a larger number of cases as a rule report lower averages; eleven with more than 500 cases, 9.6 per cent positive, and thirteen with less than 500, 11.9 per cent.

"Serum positive syphilis is more prevalent in the lower class residential districts of Boston.

"Charity patients show a higher per cent of positives than patients who pay their own hospital bills.

"In general the prevalence of syphilis increases as the social scale of occupations decreases, except in the so-called upper middle class which in our series gives the highest per cent of positives.

"Owing to the greater proportion of unskilled labor, outdoor occupations show a higher per cent of positives than indoor.

"Syphilis seems more prevalent in some occupations, but small numbers and local conditions render any conclusions unwarranted."

On Specific and Nonspecific Treatment of General Paralysis.*

Franck. Schweiz, in *Med. Wchnschr.*, Basel, says that syphilis is generally amenable to treatment in most stages, but is not considered so when it has reach the cerebrospinal system in the form of general paralysis or tabes. A hematocephalic barrier is generally considered to exist. In certain pathological conditions this barrier is dropped and certain poisons which are normally rejected pass into the nervous system. This is the case in acute infectious dis-

eases, such as, diphtheria, tetanus, and tubercular meningitis. Chronic intoxications from alcohol, morphin, or arsenic, on the other hand, increase this hematocephalic resistance.

The fever inducing treatment has aimed at temporary lowering of the barrier. v. Wagner-Jauregg has tried erysipelas, typhoid, scarlet fever, pneumonia, inoculations in connection with mercury and arsenobenzene treatment. He has used malaria virus and tuberculin, Besredka antityphoid, and other vaccines, and subcutaneous injections of protein. The author's results with these inoculations have not been satisfactory. With v. Wasssermann and Takaki, who prepared 10 fatal doses of tetanic toxin and 1 c. m. rabbit brain emulsion, the author used antitetanic serum combined with specific treatment.

He treated 4 cases of general paralysis with undeniable clinical and serological improvement in one instance. In that case the Wassermann reaction was 3 plus and the Vernes test showed 1.50. Two other cases were somewhat improved serologically. In the fourth case there was no clinical improvement, but marked serological regression. Malaria can not be employed, as it is rare in Switzerland.

Bravais-Jacksonian Syphilis. Epilepsy, Quickly Suppressed by Treatment.*

Derville, in the *Jour. de. med. de Paris*, reports the case of a woman, aged 35, who had had syphilis for seven years. The cutaneous symptoms were erroneously diagnosed and gummata considered furuncles. Gummata of the scalp were called abscesses an incised. Six years after infection only was the suspicion of syphilis aroused and soon confirmed by the Wassermann test. An ulcerating gumma of the scalp reached dwon to the bone of the skull in the right Rolandic region. The probe did not, however, penetrate the skull. The effect of treatment was marvelous. She was given 2.400 drops tincture of iodin, bismuth (17 injections Quinby), arsenic (7.10 gms. of 190), simultaneously. At first the seizures involved the entire left side and then were restricted to the extremities. Next the abdomn and lower extremities only, and later only portions of them were involved. There was an inverse relation between the doses given and the extent of the convulsions. Improvement was lasting. After several months there was not the slightest nervous symptom. Arsenical intoxication was unavoidable in this necessarily rapid cure. It, however, was restricted to cutaneous manifestations.

News Notes

Christmas Greetings to all our Readers

and

Best Wishes for a Happy and Prosperous 1925

The Annual Conference of Secretaries of Constituent State Medical Associations

Was held at the headquarters of the American Medical Association, Chicago, November 21st and 22nd. Editors of the State journals were also invited and twelve availed themselves of the opportunity to attend. The general officers and members of the Board of Trustees were present and several addressed the meetings. Dr. E. A. Hines, of South Carolina, as chairman, and Dr. T. B. Trockmorton, of Iowa, as vice-chairman, presided over the sessions.

The paper on "A Definite Program for 1925," presented by Dr. F. C. Warnshuis, of Michigan, received much favorable comment and was referred to a committee for action on the suggestions offered. A topic especially stressed in this paper was "Acquaintanceship" with the County organization, the State Society, and the American Medical Association, that doctors might have a better understanding of the organizations and the benefits to be derived from fellowship in them.

Several speakers urged that the subject of periodic, or birthday, health examinations of the well receive greater attention. As a means to popularizing this movement, one society offered to make a physical examination, at its annual meeting, of the first one hundred of its members applying.

"*Hygeia*," the laymen's health magazine published by the A. M. A., received much favorable comment and was endorsed as a means of educating the public in matters pertaining to health.

Workmen's Compensation Laws as they affect the doctor and the workman, and graduate extension work were among other subjects discussed.

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On the first evening, an editorial "round table" was held at a large table especially prepared during the dinner hour and this proved an interesting feature to those representing the State journals.

The Board of Trustees of the American Medical Association met on this occasion also, and made the following appointments:

General Manager of the Association: Dr. Olin West.

Editor of the *Journal of the A. M. A.*: Dr. Morris Fishbein.

Business Manager of the Association: Mr. Will C. Braun.

The Southern Medical Association

Held its eighteenth annual meeting in New Orleans, La., November 24 to 27, inclusive, under the presidency of Dr. Charles L. Minor, Asheville, N. C. There was an attendance of about 2,500 and the meeting was a pronounced success, scientifically and socially. Virginia was represented officially by Dr. A. L. Gray, of Richmond, at the complimentary dinner given presidents and secretaries of State Medical Associations and State Health Officers, on Tuesday evening, the 25th.

One of the most important measures adopted at this meeting was the authorization of a Section on Gastro-Enterology which will take the place of the Southern Gastro-Enterological Association which has been an affiliated organization of the Southern Medical Association.

Dallas, Texas, was selected as the meeting place for 1925, and the following officers were elected: President, Dr. Stewart R. Roberts, Atlanta, Ga.; vice-presidents, Dr. Robt. H. McGinnis, Jacksonville, Fla., and Dr. Homer Dupuy, New Orleans; secretary-manager, Mr. C. P. Loranz, Birmingham, Ala.; editor of the journal, Dr. M. Y. Dabney, Birmingham, Ala.; new councilors, Dr. Edward H. Cary, Dallas, Texas, Dr. W. S. Leathers, University, Miss., and Dr. Charles L. Minor, Asheville, N. C.

The Gorgas Memorial.

During the past year, throughout the United States, the work of organizing the Gorgas Memorial State Governing Committees has been progressing. In some states the response has been most enthusiastic, while in others considerable effort has been necessary to bring home to the doctors, the importance of this movement to them, individually and collectively. Inasmuch as the Gorgas Memorial is primarily a medical movement and as such must have the united support of the profession if it is to make the proper impression on the general public, we take this occasion to outline briefly the Gorgas plan and to request the co-operation of our colleagues in bringing to a successful issue, this national health program.

It is planned to establish a memorial for our former chief Major General William Crawford Gorgas, which will be a permanent living organization in the form of a great health foundation typical of his work in research and curative medicine, that will unite laymen and doctors in an intelligent effort to obtain better personal health—a health guild that will be supported and directed by the representatives of curative medicine.

The Gorgas Memorial consists of two phases:

1. An Institute in Panama for research in tropical diseases.

2. A health educational program in the United States and other countries that wish to co-operate and participate in the movement.

This is an age when people are knocking at all doors of knowledge and demanding that they be admitted. In the field of medicine who are so well fitted to meet this demand as those actually engaged in the practice of medicine? Doctors have a far more interesting and important message to deliver than any other group. Public ignorance is encouraged by professional reticence and the result is the astounding growth of unscientific methods. If the profession is to maintain the high standing to which centuries of labor in behalf of suffering mankind entitles it, it is essential that a definite organized effort be made to familiarize the public with such facts as will impress upon it the importance of medicine's contributions to human welfare. A constant fund of proper health information through the newspapers, magazines, lectures, moving pictures and the radio, furnished by medical men and women of known reputation and standing, will direct the public to the proper source for medical advice and gradually eliminate the irregular practices constantly increasing. One of the objects of the Gorgas Memorial is to furnish a channel through which this kind of information may be disseminated. It cannot be done by individual physicians. It must be conducted by a dignified, ethical organization, controlled by the medical profession.

Governing committees are now in process of

organization, on the basis of 100 members to every 1,000,000 population in each state; seventy-five per cent of the personnel of each committee wil consist of medical men and twenty-five per cent of influential laymen and women. The permanent activities of the organization will be supervised by these Committees in their respective states, in co-operation with the National Executive Committees.

The organization is endeavoring to raise an Endowment of $5,000,000, the interest only of which will be utilized to carry on the work. The principal will be invested in trust securities and remain intact. None of the money thus obtained will be spent for buildings or equipment. The Republic of Panama has donated the site and guaranteed the initial buildings and equipment for the tropical research laboratories, in recognition of Gorgas' work in Panama. Those invited to serve as Founder members of the State Governing Committees are requested, as they accept membership on the Commitee, to subscribe $100 to the Endowment Fund, payable within two years. Every individual on the State Committee is a contributing member. When the medical nucleus of the organization is complete, a general appeal for funds will be made to the public.

The Memorial has been endorsed by the American Medical Association and by numerous other medical and civic organizations. Every doctor is requested to take a personal interest in the Gorgas program and to see that his community is adequately represented on the State Governing Committee. This is one foundation that is controlled by the practitioners of curative medicine and as such should be supported by every practicing physician.

President Calvin Coolidge, is Honorary President, and Dr. Franklin Martin, Chicago, Vice-President. Executive offices of the Gorgas Memorial are at 410 North Michigan Ave., Chicago, Illinois.

The Association of Surgeons of the Chesapeake & Ohio Railway

Held its annual meeting at White Sulphur Springs, W. Va., November 7-8, with its usual good attendance and excellent scientific program. Officers elected for the ensuing year are: President, Dr. L. L. Bigelow, Columbus, O.; vice-presidents, Drs. R. J. Wilkinson, Huntington, W. Va.; Eric R. Twachtman, Cincinnati, O.; and Horace L. Goodman, McKendree, W. Va.; secretary-treasurer, G. H. Meanley, Richmond, Va. Members of the Executive Committee for the year are: Drs. W. E.. Vest, Huntington, W. Va.; E. H. Griswold, Peru, Ind.; R. S. Griffith, Basic City, Va.; W. R. Laird, Montgomery, W Va.; Chas. C. Garr, Lexington, Ky., and R. Finley Gayle, Richmond, Va.

Dr. Martin B. Hiden,

Of the class of '11, University of Virginia, has located at Waterford, Va., where he is engaged in the practice of his profession.

Dr. E. M. Magruder,

Charlotttsvile, Va., was again named head of the Clan MacGregor, which held its annual reunion in Washington, D. C., in November.

Dr. R. W. Fowlkes,

Richmond, Va., was elected a member of the board of directors of the University Club, this city, at its annual meeting last month.

A Good Xmas Present.

What better present could the doctor give his patient at the Xmas season than a subscription to *Hygeia*, the magazine published by the American Medical Association, which is devoted to "individual and community health?" It costs only $3.00 a year and gives authoritative information to the public about matters of health—just what you want your patient to have.

Your orders sent to the office of the Medical Society of Virginia, 104½ West Grace Street, Richmond, Va., will receive immediate attention.

Soldiers' Memorial.

Watertown, Mass., plans to erect a health building as a memorial to its men who served in the world war. This building will house the local Red Cross Chapter, and provide space for tuberculosis, child welfare, dental and other clinics.

Physical Examination of Child Workers in Milwaukee.

Milwaukee requires that every child entering industry permanently must be given a physical examination. If physical defects are found a permit is issued on the understanding that the defects will be corrected and that the child will report for re-examination.

According to the Wisconsin Industrial Commission, of the 2,507 Milwaukee children receiving permits for first full-time employment

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during the year 1923-24, only eighteen per cent were classed as sound and free from physical or health defects.

Getting Ready for School.

California believes in getting children physically ready for school and in twenty of her fifty-eight counties is giving physical examinations to pre-school children. The State board of health, the State board of education, women's clubs and other organizations, local doctors and nurses are all helping in this work.

Married.

Dr. Henry S. Stern and Miss Adele Lewit, both of Richmond, Va., November 19th.

Dr. Joseph L. Wright, Harrisonburg, Va., and Mrs. Anne Blackburn Hall, Roanoke, Va., November 22nd.

Dr. Carter Nelson Berkeley, Richmond, Va., and Miss Frances Elizabeth Cobb, Stony Creek, Va., November 26th.

Alumni Chapter of M. C. V. in New York City.

An alumni chapter of the Medical College of Virginia has been formed in New York City, with Dr. I. S. Tractenberg, Brooklyn, of the class of '13, as president. There are approximately sixty alumni of the Medical College of Virginia in and around New York City and it is believed this organization will be an active one.

The American Association for the Advancement of Science

And its associated organizations will hold their annual meeting in Washington, D. C., December 29, 1924-January 3, 1925, inclusive.

Heads Department of Medicine at Tulane University.

Dr. John H. Musser, Jr., who has been assistant professor of medicine at University of Pennsylvania School of Medicine, Philadelphia, has been appointed professor and head of the department of medicine at Tulane University School of Medicine, at New Orleans, La. He will succeed Dr. George S. Bel, resigned.

To Alumni of N. Y. Skin and Cancer Hospital.

Graduates of this Post-Graduate school are requested to send their present professional office address to the secretary of the re-organized Alumni Association, Dr. Harman Goodman, 15 Central Park West, New York City.

Dr. Tom A. Williams,

Washington, D. C., after atending the meeting of the Southern Medical Association in New Orleans, went to Miami, Fla., where he will spend the winter. He will not return to Washington until April 1st.

Dr. Kenneth W. Kinney, of the Calverton Apartments, who is associated with Dr. Williams, will have complete charge of the work until Dr. Williams' return.

A Useful Book in Prescribing Diets.

The Charles B. Knox Gelatine Company, Johnstown, N. Y., has prepared a book of dietetically correct recipes with gelatine for patients on diet and will mail a copy postpaid and free of charge to any physician or dietitian requesting it.

Dr. H. S. Belt,

South Boston, Va., recently visited his son who is at school in Lynchburg, Va.

Dr. and Mrs. Robert S. Preston,

Richmond, are home again after a visit to New York City.

Dr. E. M. Chitwood,

Wytheville, Va., has been recommended for appointment as a captain in the medical corps, Virginia National Guard, with authority to organize a medical detachment of the 116th infantry in that city.

Doctors Enjoy Hunting Season.

Drs. H. M. DeJarnette and C. Mason Smith, of Fredericksburg, Va., have been enjoying duck hunting on the Rappahannock River.

Dr. G. B. Barrow, Clarksville, Va., has been doing some hunting with friends at a hunting camp on Roanoke River.

Fire at Glenwood Park Sanitarium.

Glenwood Park Sanitarium, Greensboro, N. C., was visited by fire about noon, November 30th, and suffered a property loss of about $15,000. All patients were safely removed from the burning building.

Dr. C. E. Foley,

After spending some time in Washington, D. C., announces that he has located in Raleigh, N. C., where he is connected with the Gibson Eye, Ear, Nose and Throat Clinic.

Dr. and Mrs. H. T. Hopewell,

Strasburg, Va., recently motored to Lexington, Va., for a visit to their son at the Virginia Military Institute.

Dr. and Mrs. Millard Saunders,

Norfolk, Va., were recent visitors at Arvonia, Va.

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Campaign Against Rickets.

Cod-liver oil was found helpful in preventing rickets among Italian babies of the Mulberry district in New York City. In this district the city bureau of child hygiene and the Association for Improving the Condition of the Poor found that fully one-fourth of the children of pre-school age were suffering orthopedic defects, due largely to rickets in babyhood. One hundred and fifty babies between three and nine months old were brought to a clinic and given follow-up care by its nurses. An effort was made to see that these babies received cod-liver oil regularly during a period of four months. At the end of the experiment, it was found that seventy-one per cent of the babies who took the oil regularly showed no signs of rickets, whereas only thirty per cent of the babies who did not receive the oil were free from the disease.

U. S. Civil Service Examinations.

The U. S. Civil Service Commission, Washington, D. C., announces open competive examinations for Medical Officer, Junior Grade, entrance salaries up to $2,000; Medical Officer, Grade A, entrance salaries up to $3,250; Medical Officer, Grade B, entrance salaries up to $4,250. The examinations are open to both men and women, citizens of the United States, who meet requirements. Applications will be rated as received until hour of closing business December 30, 1924, unless sufficient eligibles are obtained before that time.

Buy Christmas Seals!

The seventeenth annual Christmas Seal Sale is now on. Seventeen million Christmas seals have been distributed in Virginia. Last year, total sales in this State were $57,463.44. This money is used to maintain free tuberculosis clinics; public health nurses; indigent patients at sanatoria; and for preventive work among children, such as the fresh air classes, nutrition classes, summer camps, etc. There are about 26,000 active cases of tuberculosis in Virginia.

Help fight the "white plague" in Virginia by buying Christmas seals NOW.

Promotions in Medical Service of Military.

Dr. Ernest T. Trice, Richmond, has been named major-surgeon of the 246th Coast Artillery, to succeed Major Waller N. Mercer, who has been transferred to the Medical Officers' Reserve Corps.

Dr. John O. Boyd,

Roanoke, Va., was recently elected vice-president of the Kiwanis Club of that city.

Dr. T. S. Richardson,

Waynesboro, is one of the many Virginia doctors who has enjoyed hunting this Fall.

World's Need for Opium and Other Drugs Tabulated.

A report made at the second opium conference at the League of Nations shows the amounts of opium and its equivalents used in the principal nations of the world. Reports of twenty-five nations, representing a total population of approximately 745,000,000, show the total estimated requirements are 551,548 kilos. The estimated average requirement per capita varies from 1.2 grams in Switzerland to .03 grams in Haiti. The average requirement per capita for all nations is a little more than .4 grams per year.

India's requirements are the greatest of all the nations, totaling 364,800 kilos, while the United States is second with a total requirement of 61,818 kilos. The requirements per capita in the United States, however, are not so great as in some countries.

The purpose of the work of the opium conference of the League of Nations is to control by mutual agreement and international cooperation the production, manufacture and distribution of opium, morphine and other drugs of a similar nature.

Industrial Blindness.

The report of the National Committee for the Prevention of Blindness on eye hazards in industrial occupations shows that of 100,000 blind persons in the United States approximately 15,000 are the industrial blind and that there are approximately 20,000 industrial accidents resulting in injuries to the eyes each year. It has been found out that many of these accidents could be easily prevented on the one hand by employers through more thorough provision of safety devices, safety education and supervision of operations, and on the other hand by employees through more conscientious use of the safeguards provided by progressive employers.

Dr. J. Thomson Booth

Has returned to his home in Ashland, Va., after a visit to Norfolk, Va.

Medical College of Virginia Celebrates its Birthday.

On December the 1st, the Medical College

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of Virginia, Richmond, celebrated its eighty-seventh birthday with appropriate exercises in the Egyptian Building known as the "old college," on Thirteenth and Marshall Streets. Dr. Stuart McGuire, president of the college presided and introduced the two speakers, Governor Trinkle, who gave a short talk and Dr. Douglas Freeman, who reviewed the history of the college from the time it was authorized as an independent college by the board of trustees of Hampden-Sidney College, on December 1, 1837. By an act of the General Assembly of Virginia, in 1854, the college ceased to function as the medical department of Hampden-Sidney College and was incorporated under the name of the Medical College of Virginia.

It was cited that this was the only college in the South which maintained its course in medical instruction for the entire period of the War betwen the States. In 1913, the University College of Medicine and the Medical College of Virginia were consolidated under its present name, and the school has continued to grow in usefulness. A large number of physicians, dentists, pharmacists and nurses are graduated from the institution each year. More than 4,500 have received their training in the two schools and it is stated that about 3,000 of these are now living.

Dr. and Mrs. William M. Smith

Have closed their home near Berryville, Va., and are spending the winter in Richmond.

Dr. Garnett Loses Home by Fire.

Dr. R. W. Garnett, health officer of Danville, Va., lost his home by fire, on the night of November the 22nd, and was painfully burned in trying to extinguish the flames.

Dr. W. W. Chaffin

Returned to his home in Pulaski, Va., the latter part of November, after spending several weeks at St. Luke's Hospital, Richmond.

The International Clinic of Oto-Rhino-Laryngology and Facio-Maxillary Surgery

Has sent out announcements for its graduate instruction at St. Louis Hospital, Paris, France. The instruction is to be given by a staff of eminent practitioners in Paris, as well as by masters invited from various countries to lecture on their particular specialties, and it is stated that the lectures will be given in English. At the same time, the student may become acquainted with foreign customs of practice as well as the languages and literature of Europe.

Dr. R. W. Vaughan,

After spending sometime at Statesville, N. C., has returned to Richmond and is located at 3616 Seminary Avenue.

Medical Interne (Psychiatric) Wanted.

Applications for this position will be rated as received by the U. S. Civil Service Commission, Washington, D. C., until June 30, 1925. The examination is to fill vacancies in St. Elizabeths Hospital, Washington, D. C., at an entrance salary of $1,860 a year. Applicants must be senior students in, or graduates from recognized medical colleges not earlier than 1920, unless they have been continuously engaged in hospital, laboratory, or research work along the lines of neurology or psychiatry since graduation. Applicants will be rated on their general education, technical training, and experience, and will not be required to report for examination at any place.

Several Richmond Doctors Ill.

Dr. J. N. Upshur, who has been ill at his home, was reported not quite so well as we go to press.

Dr. J. Allison Hodges continues critically ill at Stuart Circle Hospital, this city.

Dr. Ben H. Gray is much improved after a severe illness from pleurisy and returned to his home from the hospital the latter part of November.

Dr. B. B. Bagby, of the city Bureau of Health, recently spent several days at Woodville, Va., recuperating from an attack of influenza.

Dr. Virginius Harrison is slightly improved after having been confined to his home by sickness.

Dr. Horace G. Longaker

Has been appointed acting health officer of Newport News, Va., succeding Dr. Coleman B. Ransome who resigned to accept the position as health officer of Roanoke, Va.

Dr. Watson S. Rankin,

Secretary of the North Carolina State Board of Health, who was granted a year's leave of absence to work in connection with the International Health Board of New York, has returned to Raleigh and taken up his work with the State Board of Health.

That Golden Rod Slip!

Members of the Medical Society of Virginia, won't you look for the slip in this journal and give it your attention? The co-operation of

our members at all times has been greatly appreciated and we feel confident of your continued good will.

It may not be amiss to call attention to our advertisers. They are all A-1 and your interest in and support of them is of benefit to them and your journal.

Dr. W. T. Graham,

Richmond, has been elected to membership in the Virginia Alpha Chapter, mother of all Phi Beta Kappa chapters, and was among those to receive key at its annual celebration at William and Mary College, Willamsburg, Va., on December 5th.

Rear Admiral Stitt to be Reappointed Surgeon General of Navy.

Just before Congress convened, it was announced that President Coolidge would send to the Senate his renomination of Rear Admiral Edward R. Stitt as Surgeon General of the U. S. Navy, which is practically synonymous with his reappointment.

School Examiners in West Virginia.

Drs. Samuel H. Burton and George M. Burton, of Weston, W. Va., have been appointed school examiners for the independent districts of that city.

The Society of Neurological Surgeons

Held its semi-annual meeting in Richmond, December 5th and 6th, under the presidency of Dr. Charles A. Elsberg, of Columbia University, New York. About twenty prominent brain specialists attended this meeting. Clinics were held at Memorial Hospital by Dr. C. C. Coleman, Richmond member. The next meeting will be at Columbia University, New York, in June. Dr. Elsberg remains president and Dr. Ernest H. Sachs, of Washington University, St. Louis, secretary.

Dr. William H. Parker,

Richmond, Va., has been elected by unanimous vote as supervisor of athletics at the Medical College of Virginia, of which school he is an alumnus.

Dr. and Mrs. W. Tilden Smith,

Norfolk, Va., were recent visitors at Saluda, Va.

Dr. and Mrs. Beverley R. Tucker

Have returned to their home in Richmond, after a visit to Florida.

The American Board of Otolaryngology

Was organized in Chicago on November 10th, with Dr. Harris P. Mosher, Boston, president, and Dr. Hanau W. Loeb, St. Louis, secretary and treasurer. The office of the Board is at 1402 South Grand Boulevard, St. Louis, Missouri. The board comprises representatives of the five national otolaryngologic associations: the American Otological Society, the American Laryngological Association, the American Laryngological, Rhinological and Otological Society, the American Academy of Ophthalmology and Otolaryngology and the Section of Laryngology, Otology and Rhinology of the American Medical Association.

The object of the association is to elevate the standard of otolaryngology, to familiarize the public with its aims and ideals, to protect the public against unqualified practitioners, to receive applications for examination in otolaryngology, to conduct examinations of such applicants, to issue certificates of qualification in otolaryngology and to perform such duties as will advance the cause of otolaryngology. The first examination will be held at the time of the meeting of the American Medical Association.

Japan and Child Labor.

A recent communication from Japan to the U. S. Department of State announces that Japan has ratified the draft convention adopted by the International Labor Conference of 1920, prohibiting the employment of children under fourteen on vessels, and also a draft convention adopted in 1921 providing for compulsory medical examination of minors under eighteen employed on vessels.

Acting Dean of Department of Medicine, U. Va.

Dr. James Carroll Flippin, professor of clinical medicine at the University of Virginia, has been appointed acting dean of the Department of Medicine, at the University of Virginia, for the session 1924-1925, to succeed Dr. Theodore Hough who died recently.

Physician Wanted.

Good location in small town on Southern railroad, for price of property. Address "M," care this journal. (Adv.)

Wanted.

Interne for small hospital. Write qualifications, experience, and salary expected in first letter. Address Box 359, Martinsville, Va. (Adv.)

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Obituary

Dr. Theodore Hough,

Dean of the Medical Department of the University of Virginia and well known teacher and author, was found dead in his office on November 30th, death being due to heart trouble. Dr. Hough was born in Front Royal, Va., June 19, 1865. He studied at Johns Hopkins University, Baltimore, from which he took his Ph.D. degree in 1893. He then taught in several schools in Boston, Mass., until 1907, at which time he was elected professor of physiology and biochemistry at the University of Virginia and, upon the death of Dr. Richard Whitehead, he became dean of the medical department of the University. Dr. Hough had been an associate member of the Medical Society of Virginia since 1908. He held membership in a number of scientific and educational societies and in 1922 was president of the Association of American Medical Colleges. He is survived by his wife, formerly Miss Nellie Whitehead, of Richmond.

Dr. Hermann Boerhaave Anderson,

The oldest and one of the most prominent practicing physicians of Hanover County, Va., died November 17th, at his home at Noel, following a stroke of paralysis on the 7th of the month, from which he failed to rally. Dr. Anderson was a native of Hanover County and sixty-eight years of age. He graduated from the Medical College of Virginia in 1882 and had been a member of the Medical Society of Virginia since 1908. He had been superintendent of the Sunday School of the Baptist Church near his home for many years. The interment was in Hollywood Cemetery, Richmond. Dr. Anderson is survived by his wife and several sons and daughters.

The Hanover County Medical Society met on November 18, and passed the following resolutions on Dr. Anderson's death:

Resolutions on Death of Dr. Anderson.

WHEREAS, Dr. Hermann B. Anderson, of Noel, Va., was the oldest practicing physician in Hanover County, and, whereas, Dr. Anderson has endeared himself to the people of Hanover and to his colleagues of the medical profession by his long term of faithful service and brotherly counsels, and, whereas, it has pleased the Supreme Powers to withdraw our colleague from the scenes of his temporal activities; therefore,

Be it Resolved, That this gathering of physicians do offer his family their heartiest sympathies and hereby make known to them their desire to be of service in some way to them in their hour of trial.

Be it Resolved, further, That it is the consensus of opinion of this gathering of physicians that the citizenship of the county has sustained a heavy loss and that the ranks of the medical profession have been weakened by the passing of this spirit back to its Creator.

And be it Resolved, That these resolutions be spread upon the minutes of this Society, a copy be sent to the bereaved family of our deceased colleague, and the same be published in the county paper and State Medical Journal.

HANOVER COUNTY MEDICAL SOCIETY,
T. J. STANLEY, *President.*
J. A. WRIGHT, *Sec'y.-Treas.*

Dr. James Adolphus Rice,

Heathsville, Va., died suddenly November 18th, presumably of cerebral hemorrhage, as he was putting his automobile in his garage. He was fifty-eight years of age and a graduate in medicine from the University of Virginia in 1901. Dr. Rice had been a member of the Medical Society of Virginia for a number of years and was actively identified with the medical interests of his community. His funeral was conducted with Masonic honors. His wife and a daughter survive him.

Dr. Charles Minor Blackford, II.,

Staunton, Va., was found dead in his office, on the afternoon of November 6th. He was fifty-nine years of age and a graduate in medicine from Columbia University Medical School, after which he studied in Vienna. Owing to impaired health, however, he had not practiced his profession for many years. He was for a number of years connected with the research department of the U. S. Fisheries Commission. Dr. Blackford was a versatile writer and will be remembered for the interesting articles he wrote on Staunton and vicinity prior to our recent meeting in that city. A son survives him.

Dr. John Bingham Roberts,

Philadelphia, emeritus professor of surgery at Jefferson Medical College, and an ex-president of the American College of Surgeons, died November 28th as a result of injuries received a month ago when he was struck by an automobile. He was seventy-two years of age and had graduated in medicine from both the Jefferson Medical College and the University of Pennsylvania.

Dr. Branch Tucker Fields,

Greensboro, N. C., died October 23rd, from heart disease. He was thirty-eight years of age and a graduate from the University College of Medicine, Richmond, in 1912. Dr. Fields was connected with the staff of St. Leo's Hospital, Greensboro, and was a member of the Medical Society of the State of North Carolina.